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Headquarters Air Mobility Command

JOINT CARGO AIRCRAFT (JCA) MISSION SUITIBILITY:

Dimensional Analysis of Historical Cargo

2Lt Christopher M. Jones

11 June 07

Enabling the "Global" in "Global Vigilance, Reach and Power!"

OVERVIEW

- **Informational Brief of AMC/A9's Analysis of Historical C-130 Missions and Legs That Were Analyzed For JCA Suitability** (GATES Database, CENTCOM Data, Jan 05 to Jan 06)
  - Background
  - Methodology
  - Results
  - Questions

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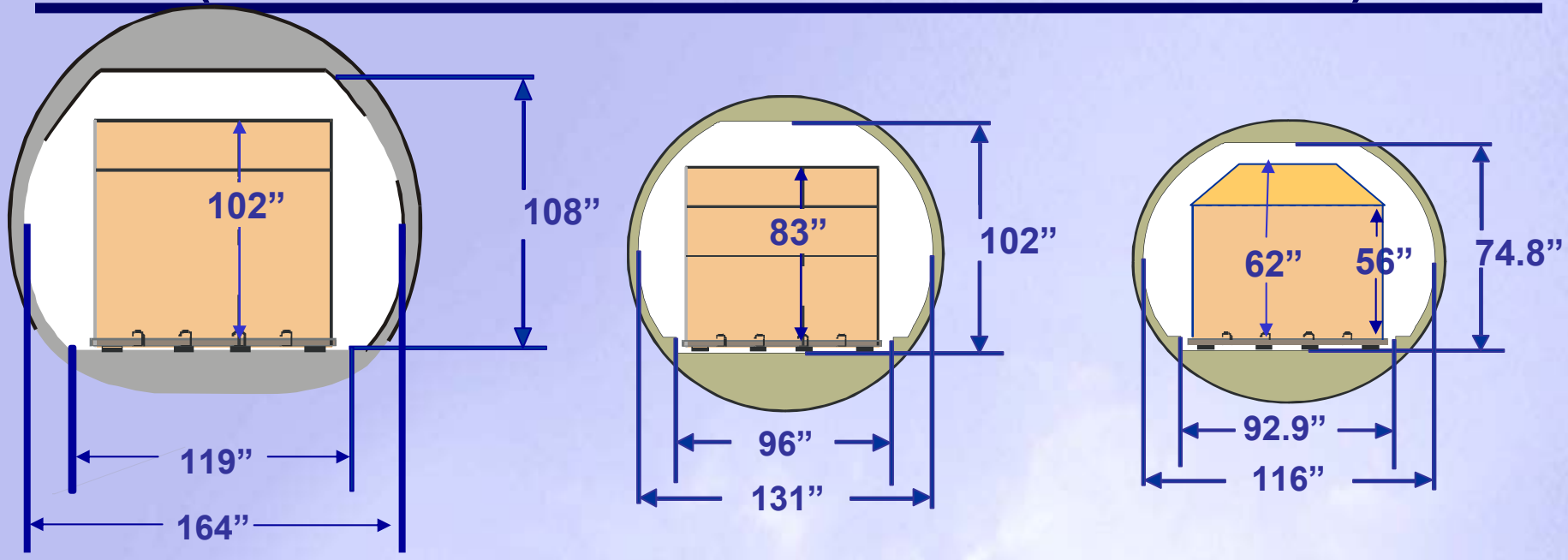
BACKGROUND

- Current JCA Mission Performed by C-23s, CH-47s, and C-130s
  - High Hour Airframes At Or Near The End of Expected Service Life
- Previous JCA Analyses Occurred Jul 05 – Nov 06
  - Performed by Army & AF
- Dec 06 – AMC Tasked to Provide Rough Order Of Magnitude Assessment (ROMA)
  - Determine Potential USAF Requirement For JCA Aircraft
- May 07 – ROMA Released

METHODOLOGY

- Collected/Analyzed Historical C-130 Mission Data as Baseline
- Identified Legs That JCA Competitors Could Perform, With and Without CONOPS Changes
- Identified JCA-Capable Missions From Provided Data
  - Analyzed JCA Suitability From Overall Mission And Individual Leg Standpoint
  - Studied Palletized And Non-Palletized Cargo (Rolling Stock, Loose, Belly Cargo, Pallet Trains) From Historical C-130 Mission Data
  - Data Was Analyzed In Two Separate Methods

STUDY A/C COMPARISON
(AIRCRAFT CARGO BAY CROSS-SECTIONS)



C-130 *C-27J* *C-295*

- **All Aircraft Can Use Standard 463L Pallet (88” x 108”)**
  - **C-27J & C-295 Turn Pallet 90 deg**

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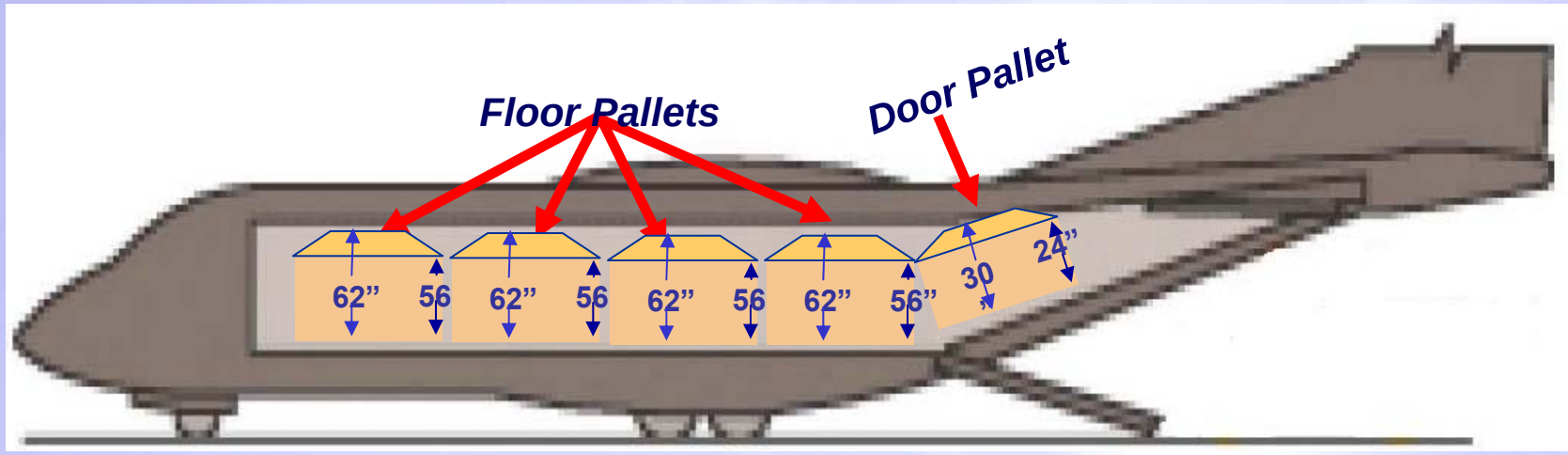
C-295 CARGO BAY

- 4 X 463L Pallet Positions On The Floor
- 1 X 463L Pallet Position On The Door (Height / Weight Restricted)
- (Assumed) Specific Trade-space Equivalence for C-295 For Cargo and PAX



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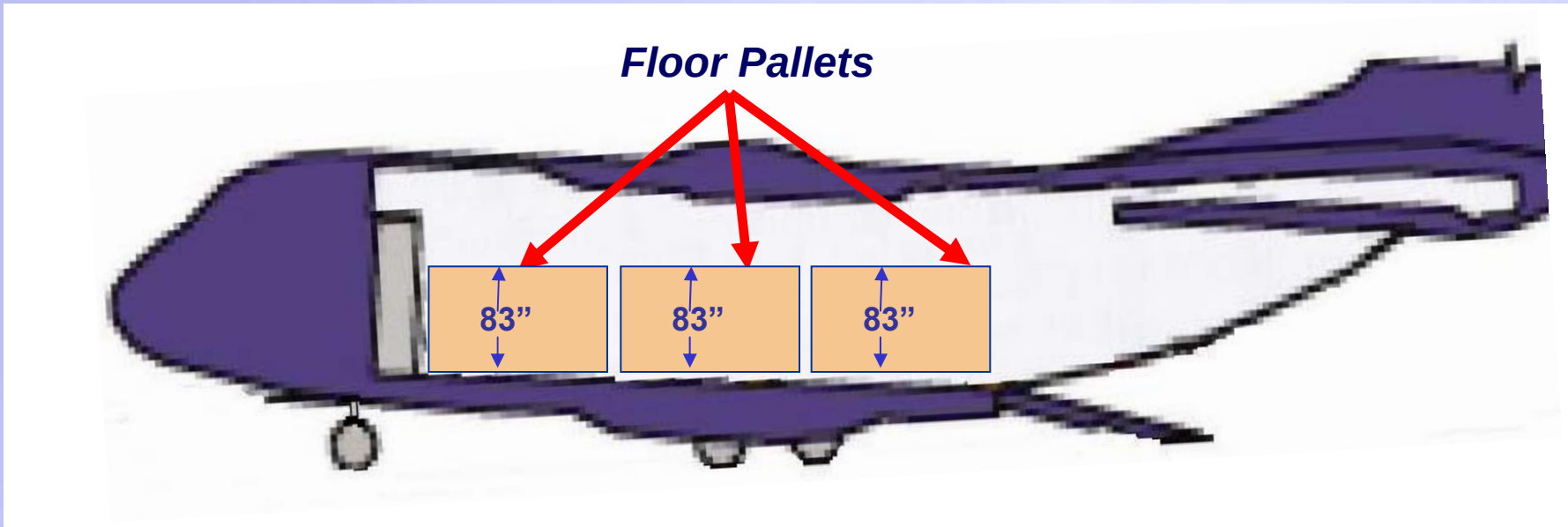
C-27J CARGO BAY

- 3 X 463L Pallet Positions On The Floor
- 1 X HCU-12 (1/2 Pallet Position) Not Considered in Analysis
- (Assumed) Specific Trade-space Equivalence for C-27J For Cargo and PAX



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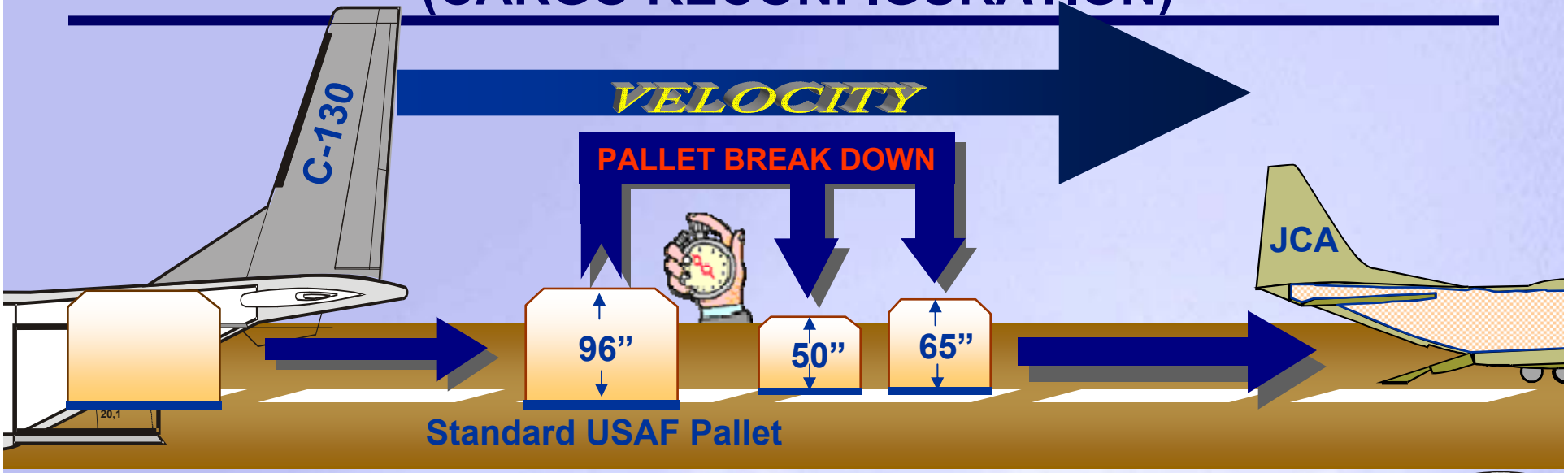
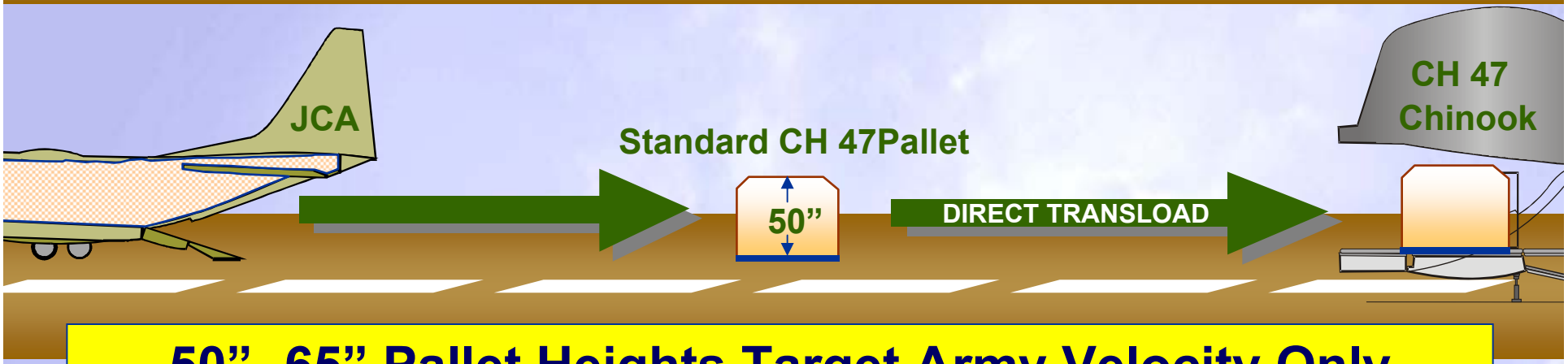
CONCERNS
(CARGO RECONFIGURATION)





50”- 65” Pallet Heights Target Army Velocity Only

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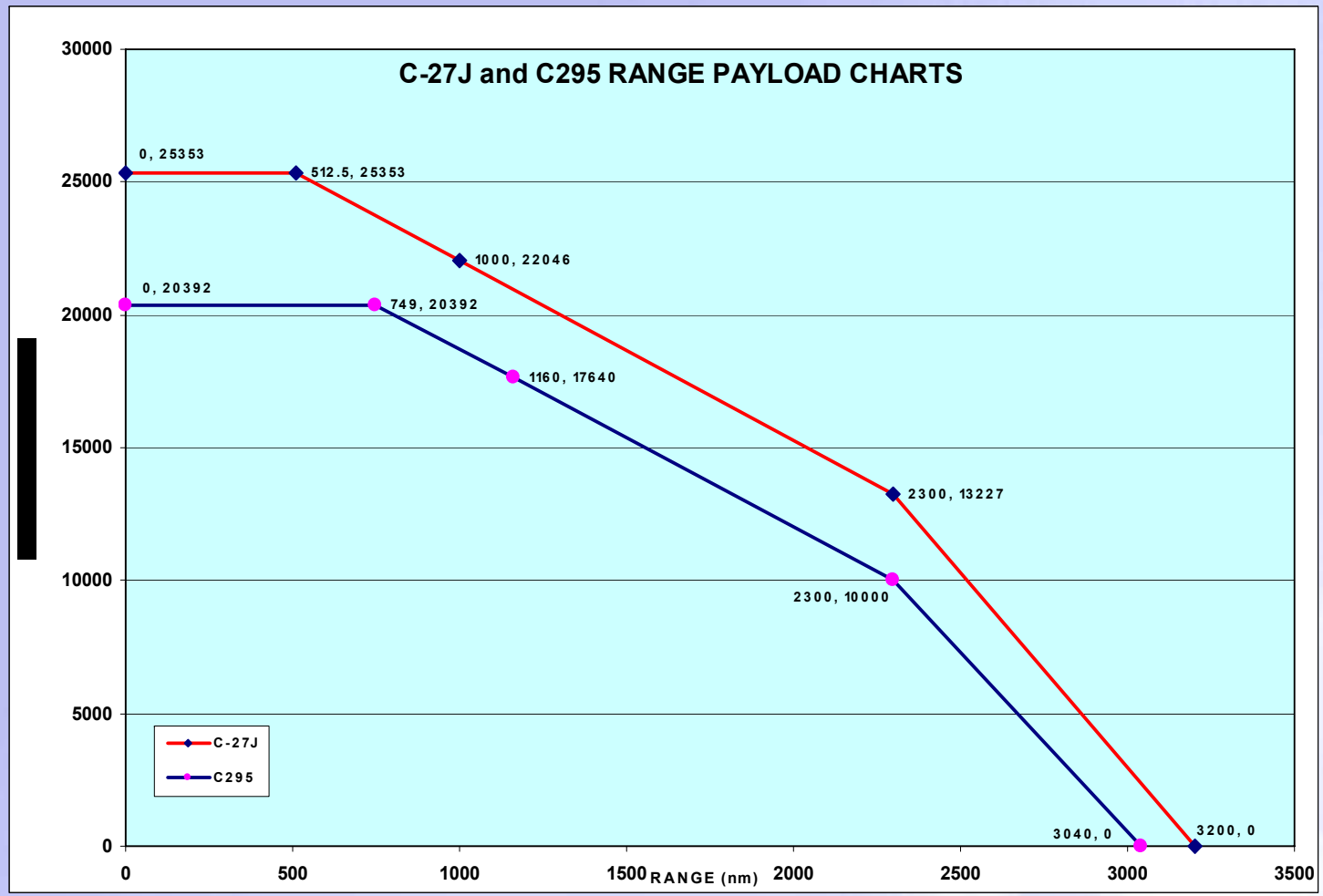
CONCERNS
(FUEL/RANGE)



C-295	
CARGO WT	RANGE (NM)
20392	0
20392	749
17640	1160
10000	2300
0	3040

RANGE (NM)	SLOPE
0 - 749	0.00
749 - 1160	-6.70
1160- 2300	-6.70
2300 - 3040	-13.51

C-27J	
CARGO WT	RANGE (NM)
25353	0
25353	512.5
22046	1000
13227	2300
0	3200

RANGE (NM)	SLOPE
0 - 512.5	0
512.5 - 1000	-6.78
1000 - 2300	-6.78
2300 - 3200	-14.70

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RESULTS

DATA RETRIEVED FROM GATES DB (JAN 2005 THRU JAN 2006)		
# MSNS	# MSN LEGS	# PALLETS
15403	35706	35038
# NON-PLT CARGO	#PAXS	TOTAL TONS MOVED
6653	775928	160286.1

RESULTS				
C-27J			C-295	
PLT HT NOT INCL	PLT HT INCL	RESULT EVALUATED	PLT HT INCL	PLT HT NOT INCL
9194	8725	# JCA CAPABLE MSNS	7860	9794
59.69%	56.64%	% OF TOTAL MSNS	51.03%	63.59%
27079	26274	# JCA CAPABLE LEGS	24772	28253
75.84%	73.58%	% OF TOTAL LEGS	69.38%	79.13%
	31025	# JCA SIZE PALLETS (HT & WT)	19831	
	88.55%	% JCA PALLETS	56.60%	
	519	# JCA NON-PAL CARGO (HT & WT)	260	
	7.80%	% JCA NON-PAL CARGO	3.91%	

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ANALYSIS SUMMARY (1)

- Reduced Cargo Bay Heights Did Not Greatly Affect The JCAs Ability to Fit Current Mission Envelopes…..(Average USAF C-130 Pallet Height In CENTCOM Was 55.6 In)
- Reduced Cargo Capacity Was Not a Major Factor In The JCAs Ability to Perform Current Mission....(Average USAF C-130 Pallet Weight in CENTCOM was 2694 LBs)
- Changing Current CONOPS by Tailoring Size of Cargo Destined for Intra-Theatre Operations Would Increase JCA Mission Contribution

ANALYSIS SUMMARY (2)

- In Fact, This Appears to be Happening Already:
  - 2489 of 32194 Pallets Were Built to 45 Inches High (7.7% of Pallet Sample)
  - 59% of The Current Pallets Were Built to Heights of 56 Inches or Less
- However, a CONOPS Change, May Drive More Pallets and/or Sorties At Intra-Theatre Locations Due To Decreased Aircraft Capacity
- CONOPS Change Could Also Drive More Inter-Theatre Sorties Due To Smaller Sized Pallets In Greater Numbers Migrating Into And Out Of Theatre

QUESTIONS?

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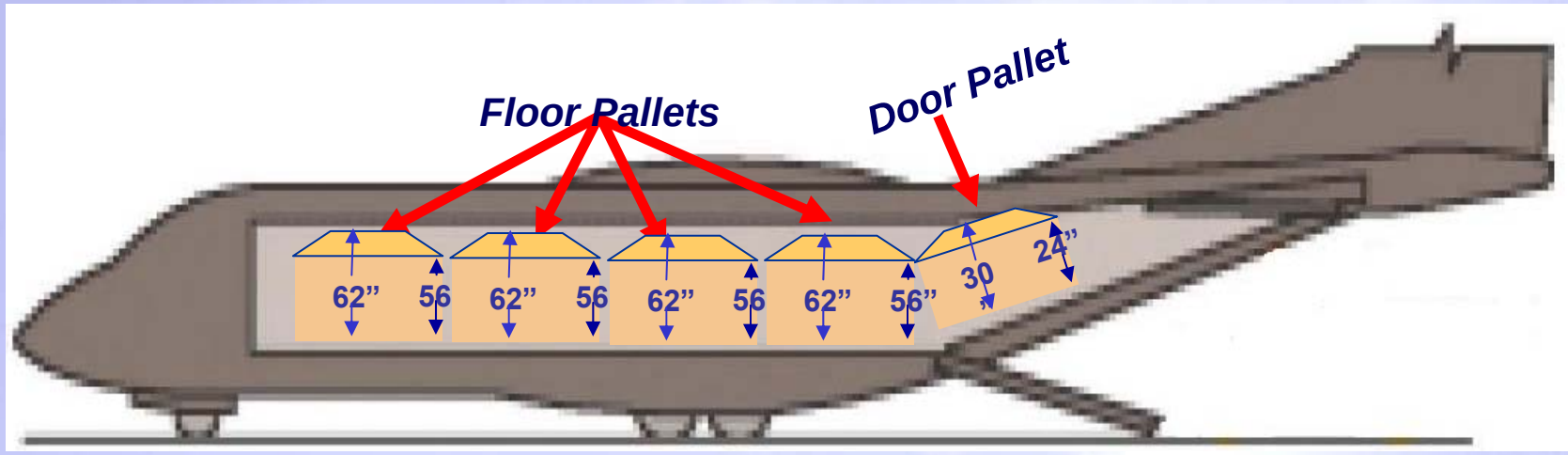
BACKUP SLIDES

DATA
(AIRCRAFT SPECIFICATIONS)

C-295 Cargo Bay Capacity

- 4 X 463L Pallet Positions On The Floor
  - Max Capacity 20392 Pounds (Assumption)
  - Max Pallet Weight 6050 Pounds
  - Max Pallet Height 56 Inches
- 1 X 463L Pallet Position On The Door
  - Max Door Pallet Weight 2200 Pounds
  - Max Door Pallet Height 24 Inches (Assumption)

- Space Lost due to PAX Quantity (Assumption)
  - 0 PAXs — 0 Pallet Positions
  - 1-18 PAXs — 1 Pallet Positions
  - 19-36 PAXs — 2 Pallet Positions
  - 37-54 PAXs — 3 Pallet Positions
  - 55-71 PAXs — 4 Pallet Positions



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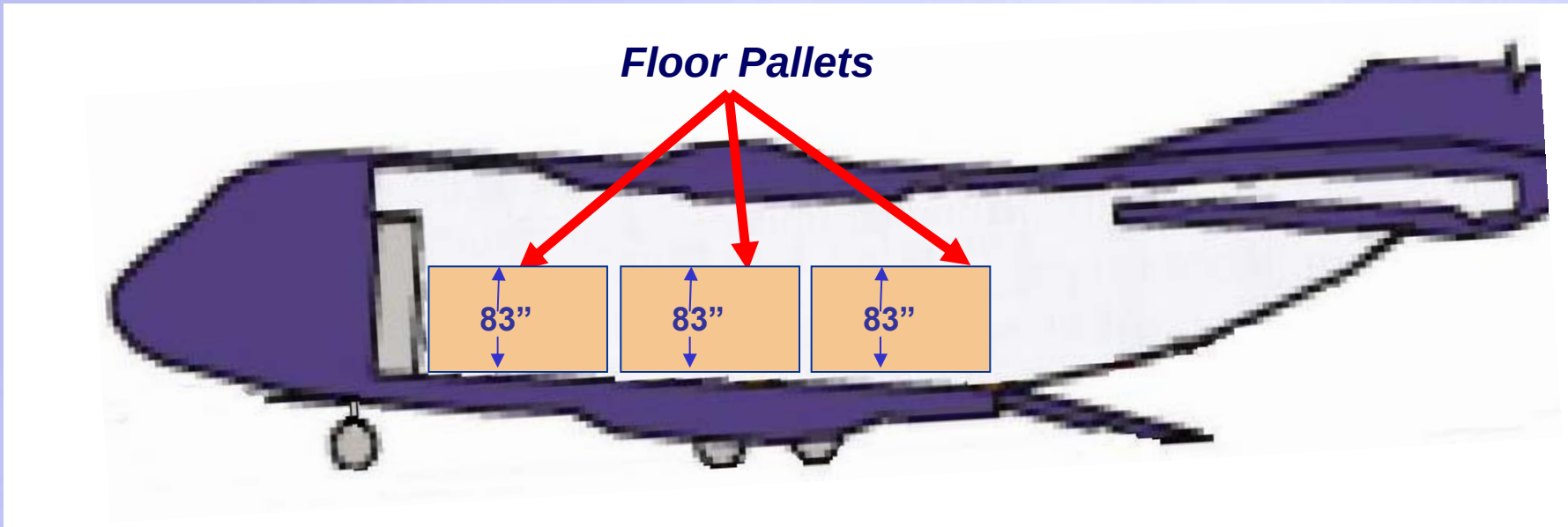
DATA
(AIRCRAFT SPECIFICATIONS)

C-27J Cargo Bay Capacity

- 3 X 463L Pallet Positions On The Floor
  - Max Capacity 25353 Pounds
  - Max Pallet Weight 9000 Pounds (Assumption)
  - Max Pallet Height 83 Inches
- Space Lost due to PAX Quantity (Assumption)

0 PAXs	0 Pallet Positions
1-23 PAXs	1 Pallet Positions
24-46 PAXs	2 Pallet Positions
47-68 PAXs	3 Pallet Positions



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DATA
(HISTORICAL C-130 GATES DATA)

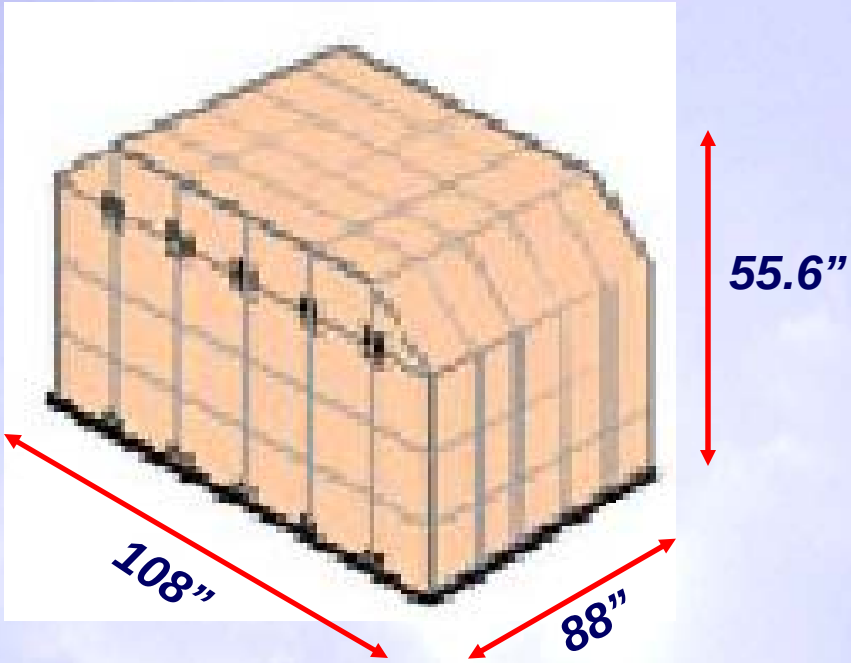
- **Of 32194 Pallets Moved by USAF C-130s in CENTCOM From Jan 05 thru Jan 06, The Average Pallet Was As Follows:**

Length = 88”

Width = 108”

Height = 55.6”

Weight = 2694 Lbs



ANALYSIS
(MSNS, LEGS, DISTANCE DETERMINATION)

APOE_MSN_ID
FMWM7774S251
FMWAYNT7S155
FLJJHPE1A213
FMWJSCT6S133
FMWJLSV6S175
FMWA1950S127
FQWJ6863J031
FQWJ6860J031
FQR21400A031
FLR21Y70A031

APOE_MSN_ID	APOE_LEG_ID	DEP_DT_TM	APOE_ICAO	APOD_ICAO	MDS
FMWM7774S251	100	01-Jan-05	OKAS	ORAT	C130H
FMWAYNT7S155	200	01-Jan-05	OKBK	ORBI	C130H
FLJJHPE1A213	400	01-Jan-05	OAIX	UTSL	C130H
FMWJSCT6S133	200	01-Jan-05	ORBD	ORAT	C130E
FMWJLSV6S175	300	01-Jan-05	OKAS	OKAS	C130E
FMWA1950S127	200	01-Jan-05	ORBI	OKAS	C130E
FQWJ6863J031	100	31-Jan-05	OTBH	ORBD	C130H
FQWJ6860J031	200	31-Jan-05	ORTL	OTBH	C130H

Compiled Data by using unique mission leg ID (Primary Key)

Used APOD and APOE locations to correct routes around IRAN

APOE_ICAO	APOD_ICAO	distance	scale	Originally crossed iran?	comments
OAIX	OBBI	1546	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAIX	OKAS	1786	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAIX	OKBK	1764	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAIX	OMAM	1302	nm	yes	corrected thru Karachi (opkc)
OAIX	ORMM	1828	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAIX	OTBH	1486	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAKN	OBBI	1337	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)
OAKN	OKAS	1577	nm	yes	corrected thru Al Dhafra (omam) and Karachi (opkc)

ANALYSIS
(HOW PAXS DETERMINATION WORKS)

APOE_MSN_ID	APOE_LEG_ID	DEP_DT_TM	MDS	SumOfNUM_PSGR	SumOfTOT_PSGR_WT	SumOfTOT_PSGR_BAG_WT
FMWAYNT7S155	200	01-Jan-05	C130H	0	0	0
FMWJLSV6S175	300	01-Jan-05	C130E	0	0	0
FMWJSCT6S133	200	01-Jan-05	C130E	3	540	285
FMWA1950S127	200	01-Jan-05	C130E	8	1495	560
FLJJHPE1A213	400	01-Jan-05	C130H	8	1659	0
FMWM7774S251	100	01-Jan-05	C130H	26	4540	1820
FBWJ6865J031	100	31-Jan-05	C130H	0	0	0
FLR21Y70A031	100	31-Jan-05	C130H	0	0	0

Compiled Data by using unique mission leg ID (Primary Key)

ANALYSIS
(HOW OTHER CARGO WORKS)

PLT_ID	PLT_VOL	PLT_DT	PLT_GROSS_WT	APC	APOE_MSN_ID	APOE_LEG_ID	MNFST_APOD	APOD_MSN_ID	APOD_LEG_ID	DEP_DT_TM	MDS	TAIL_NUM	ARR_DT_TM
KWI1HA	590	1/31/2005 1:59	4400	KWI	FQR21400A031	400	KEZ	FQR21400A032	9999	31-Jan-05	C130H	84403	2/1/2005 1:39
BAH6YY	263	1/28/2005 11:54	4940	BAH	FQWJ6924J032	200	3OR	FQWJ6924J032	300	01-Feb-05	C130J	71352	2/1/2005 20:58
O9R4DW	854	1/28/2005 12:21	5985	O9R	FQR21F50C032	100	OR9	FQR21F50C032	200	01-Feb-05	C130E	37809	2/1/2005 20:05
OA17FJ	995	1/28/2005 3:52	9990	OA1	FQR21730C032	200	OA4	FQR21740C032	300	01-Feb-05	C130H	80809	2/1/2005 10:36
3OR1QT	50	2/2/2005 17:02	1875	3OR	FQR21C30F033	200	OR5	FQR21C30F033	300	02-Feb-05	C130H	41663	2/2/2005 21:30
3OR1RP	220	2/7/2005 18:10	[illegible]	[illegible]	FKWJ6777U033	100	KEZ	FKWJ6777U033	9999	02-Feb-05	C130E	37872	2/3/2005 3:20
[illegible]	343	1/31/2005 9:00	[illegible]	[illegible]	FJWJ6986J034	100	[illegible]	FQWJ6986J034	200	02-Feb-05	C130H	23021	2/2/2005 2:30
[illegible]	977	1/31/2005 19:00	11910	OA1	FQWJ6998J033	2	[illegible]	WJ6998J033	300	02-Feb-05	C130H	80809	2/2/2005 10:51

Item ID

Height & Weight

Type & #Pos Used

APOE_ICAO	APOD_ICAO	PLT_HT	PLT_NET_WT	PLT_PCS_QY	PLT_ULTMT_CNSGNE	PLT_TY_CD	PAL_CNFG_CD	EVQ_PAL_PS	PALLET POSITIONS
OKBK	OKAS	99	4400	1	FB5820	A	RS	17	2
OBBI	ORAA	72	4250	1	R55660	L	T2	20	2
ORTL	ORBD	74	5985	1	FB5860	A	P[illegible]	10	1
OAIX	OASL	93	9990	1	W91GAH	A	RS	23	3
ORAA	ORAT	36	1520	4	OR5000	J	T2	20	2
OKAS	OKAS	49	1595	1	FB4804			1	1
OTBH	OKAS	77	2920	1	FB5820		RS	15	2
OAIX	OASD	92	11910	1	W91EB8		RS	20	2

Bool Tests

> C-295 HT?	> C-27J HT?	(C-295) > 6050 test	(C-27J) PLT WT > floor pal wt test	JCA PALLET WIDTH TEST OK? (DUE TO ROTATED PALLETS)	C-295 PALLET ENVELOPE?	C-27J PALLET ENVELOPE?
1	1	0	0	1	0	0
1	0	0	0	1	0	0
1	0	0	0	0	0	1
1	1	0	0	1	0	0
0	0	0	0	1	0	0
0	0	0	0	0	1	1
1	0	0	0	1	0	0
1	1	0	0	1	0	0

BAY HT TEST
0 = JCA PALLET
1 = C-130 PALLET

C-295 WT & DOOR HT TESTS
0= no, 1=yes

C-27J FLOOR PLT WT TEST > MAX
0= no, 1=yes

NOTE:
BIN column
for Charts

NOTE:
>6050 test is wt div by
pal pos for comparison

NOTE:
C-27J floor plt wt test is wt div by
pal pos for comparison

JCA PALLET WIDTH TEST
0 = JCA CAPABLE
1 = NOT JCA CAPABLE

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ANALYSIS
(HOW PALLETIZED CARGO WORKS)

PLT_ID	PLT_VOL	PLT_DT	PLT_GROSS_WT	APC	APOE_MSN_ID	APOE_LEG_ID	MNFST_APOD	APOD_MSN_ID	APOD_LEG_ID	DEP_DT_TM	MDS	TAIL_NUM	ARR_DT_TM
KEZDLZ	226	6/16/2005 18:34	2210	KEZ	FMWJLSV6S175	300	KEZ	FMWJLSV6S175	300	01-Jan-05	C130E	37769	6/24/2005 19:40
KEZDYA	226	6/22/2005 17:31	820	KEZ	FMWJLSV6S175	300	KEZ	FMWJLSV6S175	300	01-Jan-05	C130E	37769	6/24/2005 19:40
KWID4S	50	6/2/2005 11:38	600	KWI	FMWAYNT7S155	200	SDA	FMWAYNT7S155	300	01-Jan-05	C130H	31561	6/4/2005 17:00
OR9LEM	114	5/12/2005 13:14	1250	OR9	FMWJSCT6S133	200	OR5	FMWJSCT6S133	300	01-Jan-05	C130E	37852	5/13/2005 18:10
OR9LES	54	5/12/2005 13:25	1060	OR9	FMWJSCT6S133	200	OR5	FMWJSCT6S133	300	01-Jan-05	C130E	37852	5/13/2005 18:10
OR9LET	209	5/12/2005 13:26	1590	OR9	FMWJSCT6S133	200	OR5	FMWJSCT6S133	300	01-Jan-05	C130E	37852	5/13/2005 18:10
OR9LEU	439	5/12/2005 13:26	1390	OR9	FMWJSCT6S133	200	OR5	FMWJSCT6S133	300	01-Jan-05	C130E	37852	5/13/2005 18:10
OR9M9K	374	5/25/2005 13:16	3560	KWI	FMWAYNT7S155	200	SDA	FMWAYNT7S155	300	01-Jan-05	C130H	31561	6/4/2005 17:00

APOE_ICAO	APOD_ICAO	PLT_HT	PLT_NET_WT	PLT_PCS_QY	PLT_ULTMT_CN	PLT_TY_CD	PAL_CNFG_CD	EVQ_PAL_PS	PALLET POSITIONS
OKAS	OKAS	86	2210	1	W918AR	L	PC	10	1
OKAS	OKAS	41	820	1	CDA00H	L	PC	10	1
OKBK	ORBI	45	300	1	W91J80	L	PC	10	1
ORBD	ORAT	50	900	1	W9126A	E	PC	10	1
ORBD	ORAT	44	700	1	W9126A	E	PC	10	1
ORBD	ORAT	44	1200	1	W9126A	E	PC	10	1
ORBD	ORAT	91	1000	1	W9126A	L	PC	10	1
OKBK	ORBI	82	3185	1	W91YZ7	L	PC	10	1

> C-295 HT?	> C-27J HT?	(C-295) <=2200 lbs test	(C-295) door pallet ht test < = DR HT	(C-295) > 6050 test	(C-27J) PLT WT > floor pal wt test	C-295 PALLET ENVELOPE?	C-27J PALLET ENVELOPE?	C130 <= DR WT TEST	C130 <= DR HT TEST
1	1	0	0	0	0	0	0	1	0
0	0	1	0	0	0	1	1	1	1
0	0	1	0	0	0	1	1	1	1
0	0	1	0	0	0	1	1	1	1
0	0	1	0	0	0	1	1	1	1
0	0	1	0	0	0	1	1	1	1
1	1	1	0	0	0	0	0	1	0
1	0	0	0	0	0	0	1	1	0

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ANALYSIS
(PIVOT TESTS)

Sum of PALLET POSITIONS	APOE_LEG_ID									
APOE_MSN_ID	6	7	8	12	25	50	100	5149	5199	Grand Total
FBWJ6779J033	0	0	0	0	0	0	5	0	0	5
FBWJ6852J035	0	0	0	0	0	0	3	0	0	3
FBWJ6865J031	0	0	0	0	0	0	3	0	0	3
FBWJ6878J032	0	0	0	0	0	0	0	0	0	3
FBWJ6914J032	0	0	0	0	0	0	0	0	0	5
FBWJ6918J032	0	0	0	0	0	0	0	0	0	4
FBWJ6931J032	0	0	0	0	0	0	3	0	0	3
FBWJ6990J033	0	0	0	0	0	0	5	0	0	5
FBWJ7021J038	0	0	0	0	0	0	0	0	0	5
FBWJ7060J034	0	0	0	0	0	0	0	0	0	11
FBWJ7114J035	0	0	0	0	0	0	6	0	0	6
FBWJ7126J035	0	0	0	0	0	0	0	0	0	1
FBWJ7127J036	0	0	0	0	0	0	0	0	0	1
FBWJ7129J036			0	0	0	0	0	0	0	1

Pallet Qty and Wt summed for each unique Mission Leg ID

Sum of PLT_NET_WT	AP									
APOE_MSN_ID			8	12	25	50	100	5149	5199	Grand Total
FBWJ6779J033			0	0	0	0	18516	0	0	18516
FBWJ6852J035	0	0	0	0	0	0	9360	0	0	9360
FBWJ6865J031	0	0	0	0	0	0	17168	0	0	17168
FBWJ6878J032	0	0	0	0	0	0	0	0	0	9500
FBWJ6914J032	0	0	0	0	0	0	0	0	0	23074
FBWJ6918J032	0	0	0	0	0	0	0	0	0	13260
FBWJ6931J032	0	0	0	0	0	0	18952	0	0	18952
FBWJ6990J033	0	0	0	0	0	0	18440	0	0	18440
FBWJ7021J038	0	0	0	0	0	0	0	0	0	14307
FBWJ7060J034	0	0	0	0	0	0	0	0	0	26365
FBWJ7114J035	0	0	0	0	0	0	19801	0	0	19801
FBWJ7126J035	0	0	0	0	0	0	0	0	0	1700
FBWJ7127J036	0	0	0	0	0	0	0	0	0	6900
FBWJ7129J036	0	0	0	0	0	0	0	0	0	4340

Enabling the "Global" in "Global Vigilance, Reach and Power!"

ANALYSIS
(PIVOT TESTS)

- *INDIV CARGO ITEM BOOLEAN TESTS ARE PERFORMED AND SUMMED IN PIVOT TABLES*
- *(EXAMPLE)… ANY PALLET > 6050 LBS ON A C295 GIVE A VALUE OF 1 <= 6050 IS A 0*
- *ALL PALLETS ON EACH MSN LEG ARE EVALUATED AND THEN SUMMED IN PIVOT TABLE*
- *VALUE > 0 IN PIVOT TABLE MEANS MSN LEG CANNOT BE DONE BY C-295 Aircraft*

Sum of (C-295) > 6050 test	APOE_LEG_ID							
APOE_MSN_ID	6	7	8	12	25	50	100	101
FBWJ6779J033	0	0	0	0	0	0	0	0
FBWJ6852J035	0	0	0	0	0	0	0	0
FBWJ6865J031	0	0	0			0	1	0
FBWJ6878J032	0	0	0			0	0	0
FBWJ6914J032	0	0	0			0	0	0
FBWJ6918J032	0	0	0			0	0	0
FBWJ6931J032	0	0	0	0	0	0	2	0
FBWJ6990J033	0	0	0	0	0	0	0	0
FBWJ7021J038	0	0	0	0	0	0	0	0
FBWJ7060J034	0	0	0			0	0	0
FBWJ7114J035	0	0	0			0	0	0
FBWJ7126J035	0	0	0			0	0	0
FBWJ7127J036	0	0	0	0	0	0	0	0
FBWJ7129J036	0	0	0	0	0	0	0	0

Leg 100 for Msn FBWJ6865J031 fails for C-295 due to 1 pallet > 6050 LBs

Leg 100 for Msn FBWJ6931J032 fails for C-295 due to 2 pallets > 6050 LBs

ANALYSIS
(REASSEMBLED IN TABULAR LIST)

Fuel Switches Are Set By The User On The Fuel Sheet That Allows The User To Control Which APOs Have Fuel Or Are Capable Of Refueling. These Setting Are Updated Onto The Master Legs Compiled Sheet (Tabular List) Where The Data Is used For Mission Leg Determination

ICAO	FUEL AVAIL?
OAIX	☐
OAKN	☑
OBBI	☑
OKAS	☑
OKBK	☑
OMAM	☑
OPRN	☑
OTBH	☑

Fuel availability that was determined by the user for each ICAO updates the tabular list

APOE FUEL AVAIL?	APOD FUEL AVAIL?
TRUE	TRUE
TRUE	TRUE
FALSE	TRUE
TRUE	TRUE
TRUE	TRUE
TRUE	TRUE
TRUE	TRUE
TRUE	TRUE

ANALYSIS
(REASSEMBLED IN TABULAR LIST)

DATA REFORMED INTO TAB LISTING AND BOOLEAN VALUES FROM PIVOTS ARE BROUGHT IN FOR EVALUATION

MISSION_ID	APOE_LEG_ID	ACTYPE	APOE_ICAO	APOD_ICAO	DATE	# PLTS PER LEG	PLTS_NET_WT	TOTAL_PAX	TOTAL_PAX_WT	TOTAL_BAG_WT
FMWM7774S251	100	C130H	OKAS	ORAT	01-Jan-05	0	0	26	4540	1820
FMWAYNT7S155	200	C130H	OKBK	ORBI	01-Jan-05	3	9305	0	0	0
FLJJHPE1A213	400	C130H	OAIX	UTSL	01-Jan-05	0	0	8	1659	0
FMWJSCT6S133	200	C130E	ORBD	ORAT	01-Jan-05	4	3800	3	540	285
FMWJLSV6S175	300	C130E	OKAS	OKAS	01-Jan-05	2	3030	0	0	0
FMWA1950S127	200	C130E	ORBI	OKAS	01-Jan-05	0	0	8	1495	560
FQWJ6863J031	100	C130H	OTBH	ORBD	31-Jan-05	4	10978	0	0	0
FQWJ6860J031	200	C130H	ORTL	OTBH	31-Jan-05	0	0	1	175	95
FQR21400A031	400	C130H	OKBK	OKAS	31-Jan-05	0	0	24	4547	3260
FLR21Y70A031	100	C130H	UTSL	OAIX	31-Jan-05	4	17610	0	0	0
FBWJ6865J031	100	C130H	OTBH	OAIX	31-Jan-05	3	17168	0	0	0

C-27J FLR WT LIM TST (PAL)	C-27 HT TST (PAL)	C-295 PLT >6050 LB TST (PA	C-295 HT TST (PAL)	C-295 DR PLT <= 2200 LB TST (PAL)	C-295 DR PLT <= MAX HT TST (P	C-295 DOOR PALLET ADDER
0	0	0	0	0	0	0
0	0	0	1	1	0	0
0	0	0	0	0	0	0
0	1	0	1	4	0	0
0	1	0	1	1	0	0
0	0	0	0	0	0	0
0	0	0	2	2	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	1	0	0
0	0	1	2	0	0	0

# PLT POS USED FOR OTH C	NON-PLT CARGO NET WT	C-27J FLR WT LIM TST (OTH)	C-27J HT TST (OTH)	C-295 PLT >6050 LB TST (OTH)	C-295 HT TST (OTH)	JCA LENGTH TST (OTH)	C-27J FLR WT BOOL LIMIT TST	C-295 FLR WT BOOL LIMIT TST	C-27J HT BOOL LIMIT TST	C-295 HT BOOL LIMIT TST
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0
2	4400	0	1	0	1	1	0	0	1	1
0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	1	0	1

Enabling the "Global" in "Global Vigilance, Reach and Power!"

ANALYSIS
(REASSEMBLED IN TABULAR LIST)

TOTAL # PALLETS	TOTAL CARGO/PAX WT	C-27 PLTS LOST FOR PAX	C-27 EVAL BOOL (NO HT NO WT)	C-27 EVAL BOOL (HT INCL NO WT)	C-27J EVAL PAL WT WITH (NO HT)	C-27J EVAL PAL WT WITH (HT INCL)
0	6360	2	0	0	0	0
3	9305	0	0	0	0	0
0	1659	1	0	0	0	0
4	4625	1	1	1	1	1
2	3030	0	0	1	0	1
0	2055	1	0	0	0	0
4	10978	0	1	1	1	1
0	270	1	0	0	0	0
2	12207	2	1	1	1	1
4	17610	0	1	1	1	1
3	17168	0	0	0	0	0

Sum of all pallet positions and weights used by PAL and OTH on that leg

Determined by LOOK-UPs based of MAX PAX#/ Max Floor Pallets

Evaluations start and progress through each Boolean test

0=JCA leg

1=C130 leg

C-295 PLTS LOST FOR PAX	C-295 EVAL BOOL (NO HT NO WT)	C-295 EVAL BOOL (HT INCL NO WT)	C-295 EVAL PAL WT WITH (NO HT)	C-295 EVAL PAL WT WITH (HT INCL)
2	0	0	0	0
0	0	1	0	1
1	0	0	0	0
1	1	1	1	1
0	0	1	0	1
1	0	0	0	0
0	0	1	0	1
1	0	0	0	0
2	0	1	0	1
0	0	0	1	1
0	0	1	1	1

Enabling the "Global" in "Global Vigilance, Reach and Power!"

ANALYSIS
(REASSEMBLED IN TABULAR LIST)

All qualifying C-27J and C295 legs are then looked at to determine if they have the necessary range with the payload onboard

LEG LENGTH (nm)	C27J Y1 VALUE	C27J X1 VALUE	C27J SLOPE	C27J MAX RANGE W LEG PAYLOAD	C27J LEG W RANGE (NO HT)?	C27J LEG W RANGE (W HT)?
313	13227	2300	-14.7	2767.1	0	0
309	13227	2300	-14.7	2566.8	0	0
283	13227	2300	-14.7	3086.9	0	0
53	13227	2300	-14.7	2885.2	1	1
0	13227	2300	-14.7	2993.7	0	1
289	13227	2300	-14.7	3060.0	0	0
641	13227	2300	-14.7	2453.0	1	1
445	13227	2300	-14.7	3181.4	0	0

C27J Y1 VALUE	C295 X1 VALUE	C295 SLOPE	C295 MAX RANGE W LEG PAYLOAD	C295 LEG W RANGE (NO HT)?	C295 LEG W RANGE (W HT)?
10000	2300	-13.51	2569.4	0	0
10000	2300	-13.51	2351.4	0	1
10000	2300	-13.51	2917.4	0	0
10000	2300	-13.51	2697.9	1	1
10000	2300	-13.51	2815.9	0	1
10000	2300	-13.51	2888.1	0	0
20392	749	-6.7	2154.1	0	1
10000	2300	-13.51	3020.2	0	0

ANALYSIS
(REASSEMBLED IN TABULAR LIST)

Finally, all JCA type legs that met the range criteria are evaluated for fuel. The flight time, starting fuel qty, required reserve, burn rates, and fuel used contribute to the decision on whether the leg could be done by a C-27J, and/or C-295, or required a C-130

No Fuel was Aval At APOE. Fuel QTY is remaining + Reserve

Fuel Remaining

JCA leg NO HT?

JCA leg w HT?

0=JCA leg
1=C130 leg

C27J MAX RNG PAYLOAD FLT TIME	C27J ACTUAL FLIGHT TIME	C27J FUEL QTY AVAIL	C27J FUEL RESERVE REQ	C27J FUEL USED	C27J FUEL REMAINING (W/O RES)	C27J FUEL BURN PER HR	C27 LEG W FUEL (NO HT)?	C27 LEG W FUEL (W HT)?
9.11	0.13	3255.00	108.24	40.96	3105.79	324.72	0	0
9.65	1.37	3214.04	102.22	419.87	2691.95	306.65	0	0
7.46	2.14	3255.00	132.26	849.71	2273.04	396.77	1	1
8.06	0.20	3255.00	122.44	72.33	3060.23	367.32	1	1
7.12	0.20	3255.00	138.44	81.79	3034.77	415.33	1	1
6.45	1.14	3255.00	152.90	525.04	2577.06	458.70	0	0
7.14	0.89	3255.00	138.05	368.28	2748.67	414.15	0	0
9.49	1.00	3255.00	103.99	311.00	2840.01	311.96	0	0
C295 MAX RNG PAYLOAD FLT TIME	**C295 ACTUAL FLIGHT TIME**	**C295 FUEL QTY AVAIL**	**C295 FUEL RESERVE REQ**	**C295 FUEL USED**	**C295 FUEL REMAINING (W/O RES)**	**C295 FUEL BURN PER HR**	**C295 LEG W FUEL (NO HT)?**	**C295 LEG W FUEL (W HT)?**
10.70	0.16	1034.00	29.29	13.86	990.85	87.88	0	0
11.43	1.71	1020.14	27.42	140.80	851.93	82.26	0	0
8.04	2.68	1034.00	38.98	313.03	681.99	116.94	1	1
9.26	0.25	1034.00	33.84	24.99	975.17	101.52	0	0
7.12	0.25	1034.00	43.98	32.48	957.55	131.93	1	1
6.20	1.43	1034.00	50.55	216.99	766.46	151.66	0	0
7.18	1.11	1034.00	43.64	145.51	844.85	130.91	0	0

ANALYSIS
(MISSION DETERMINATION)

- *All mission Legs Compiled by Mission and Leg Boolean Values Summed*
- *Each Aircraft Type was Evaluated Independently With Cargo Height Considered and Not Considered*
- *If Pivot Sum value = 0 Then Entire Mission was a JCA Capable Mission*
- *Otherwise a C-130 is Required Since X Number of Legs Did Not Fit The JCA Profile*

Sum of C27 LEG W FUEL (NO HT)?	
MISSION_ID	Total
FBWJ6779J033	1
FBWJ6852J035	0
FBWJ6865J031	0
FBWJ6878J032	1
FBWJ6914J032	1
FBWJ6918J032	1
FBWJ6931J032	1

Sum of C27 LEG W FUEL (W HT)?	
MISSION_ID	Total
FBWJ6779J033	1
FBWJ6852J035	1
FBWJ6865J031	0
FBWJ6878J032	1
FBWJ6914J032	1
FBWJ6918J032	1
FBWJ6931J032	1

Sum of C295 LEG W FUEL (NO HT)?	
MISSION_ID	Total
FBWJ6779J033	1
FBWJ6852J035	0
FBWJ6865J031	1
FBWJ6878J032	0
FBWJ6914J032	1
FBWJ6918J032	1
FBWJ6931J032	1

Sum of C295 LEG W FUEL (W HT)?	
MISSION_ID	Total
FBWJ6779J033	1
FBWJ6852J035	1
FBWJ6865J031	1
FBWJ6878J032	1
FBWJ6914J032	1
FBWJ6918J032	1
FBWJ6931J032	1

DATA
(HISTORICAL C-130 GATES DATA)

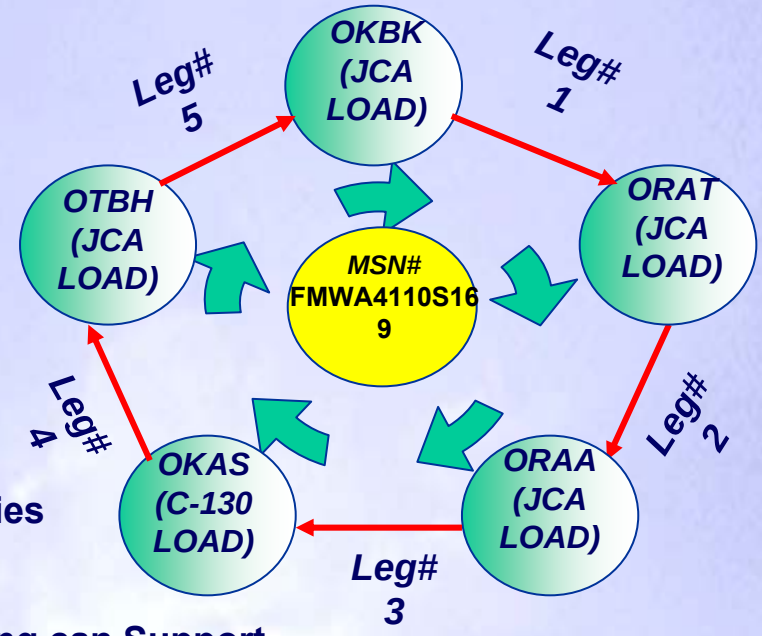
- **GATES DATABASE**

- **RELIABILITY**
  - Mission Data Set was Incomplete
    - Mission Leg Sequences Were Not Uniform Due to Diverts Supporting Time Sensitive/ Mission Critical Taskings
    - Some PAX & Cargo data Entries Were Incomplete

DATA RETRIEVED FROM GATES DB (JAN 2005 THRU JAN 2006)		
# MSNS	# MSN LEGS	# PALLETS
15403	35706	35038
# NON-PLT CARGO	#PAXS	TOTAL TONS MOVED
6653	775928	160286.1

METHODOLOGY

- Mission Consists of an Entire Circuit or Route Versus a Leg Which is <u>One Segment</u> of that Route
- Analysis Looked At Overall Mission And Individual Mission Leg Data Independently
- Look at MSN# FMWA4110S169 For Example:
- Analysis by Mission Leg Results in:
  - 4 JCA Legs
  - 1 C-130 Required Leg
  - Useful Data
    - Shows How a New Asset Could be Utilized
    - Shows How Load can be Taken Off Current Asset
    - Shows How Modified Scheduling or Planning
    - Shows How to Capitalize on New Assets Capabilities
  - Misleading
    - Shows Greater Requirements than Mission Planning can Support



- Mission Analysis of Example Results in:
  - Entire Mission Required a C-130 (5 legs) Due to C-130 Being Required on Leg #4

Enabling the "Global" in "Global Vigilance, Reach and Power!"

METHODOLOGY

Each Historical C-130 Mission Leg was Evaluated for JCA Suitability as follows:

Analyzed in Two Branches One Considering Cargo Height and One Without Height

- ***Each Cargo Item Evaluated for Weight and Height***
- ***Other Cargo (Rolling Stock /Trains) Evaluated for Length by Positions Occupied***
- ***Combined Cargo Evaluated For Quantity and Weight***
- ***Number of PAXs Evaluated Against Each Aircrafts' Capacity***
- ***PAX Quantity and Cargo Quantities Combined And Evaluated For Aircraft Fit***
- ***Each Leg Evaluated for Range/Payload***
- ***Fuel Usage Calculated To Determine Mission Leg Suitability***
- ***Each Suitable Leg Analyzed For Heights Of Cargo On Mission Leg (If Applicable)***
- ***= JCA Mission Leg***

METHODOLOGY

Overall Mission Analysis Was Done As Follows:

Again, done in two branches…one considering cargo height and one not considering cargo height

1. If Any Leg On Mission Needed A C-130 (Cargo And/Or PAX Load), Then Mission = C-130 Mission

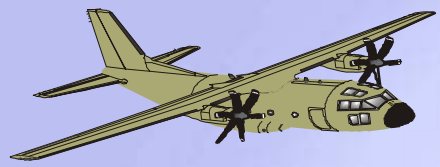
2. Otherwise, If No Legs Required A C-130, Then Mission = JCA Capable

DATA
(AIRCRAFT SPECIFICATIONS)

C-130 Aircraft

C-130 SPECIFIC DATA		
Max payload	53164	lbs
POS 1-5 Flr Pal capacity	5	plts
POS 1-4 Floor Pallet weight	10000	lbs
5th Pallet Pos weight	8500	lbs
Cargo bay height	102	in
Troop capacity	90	pax
Door Pallet capacity	1	plts
Door Pallet weight	4664	lbs
Door Pallet height	76	in
Maximum Cargo Volume	3223	cu ft.

C-27J Aircraft



C-27J SPECIFIC DATA		
Max payload	25353	lbs
Floor Pallet capacity	3	plts
Floor Pallet weight	9000	lbs
Cargo bay height	83	in
Troop capacity	68	pax

* Data obtained from http://www.c-27j.com/essential_facts.php

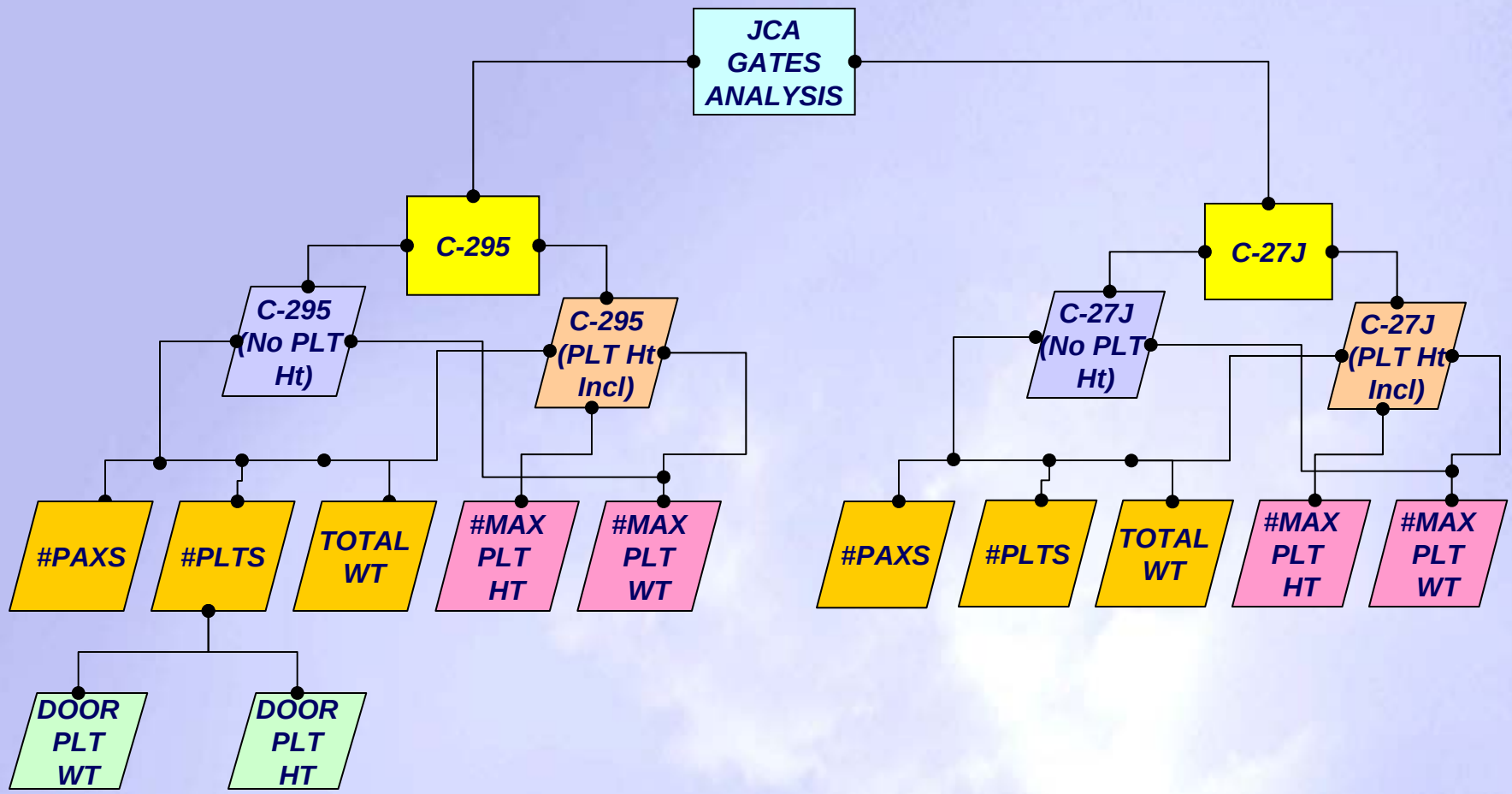
C-295 Aircraft

C-295 SPECIFIC DATA		
Max payload	20392	lbs
Floor Pallet capacity	4	plts
Floor Pallet weight	6050	lbs
Cargo bay height	56	in
Troop capacity	71	pax
Door Pallet capacity	1	plts
Door Pallet weight	2200	lbs
Door Pallet height	24	in

* Data obtained from http://www.team-jca.com/

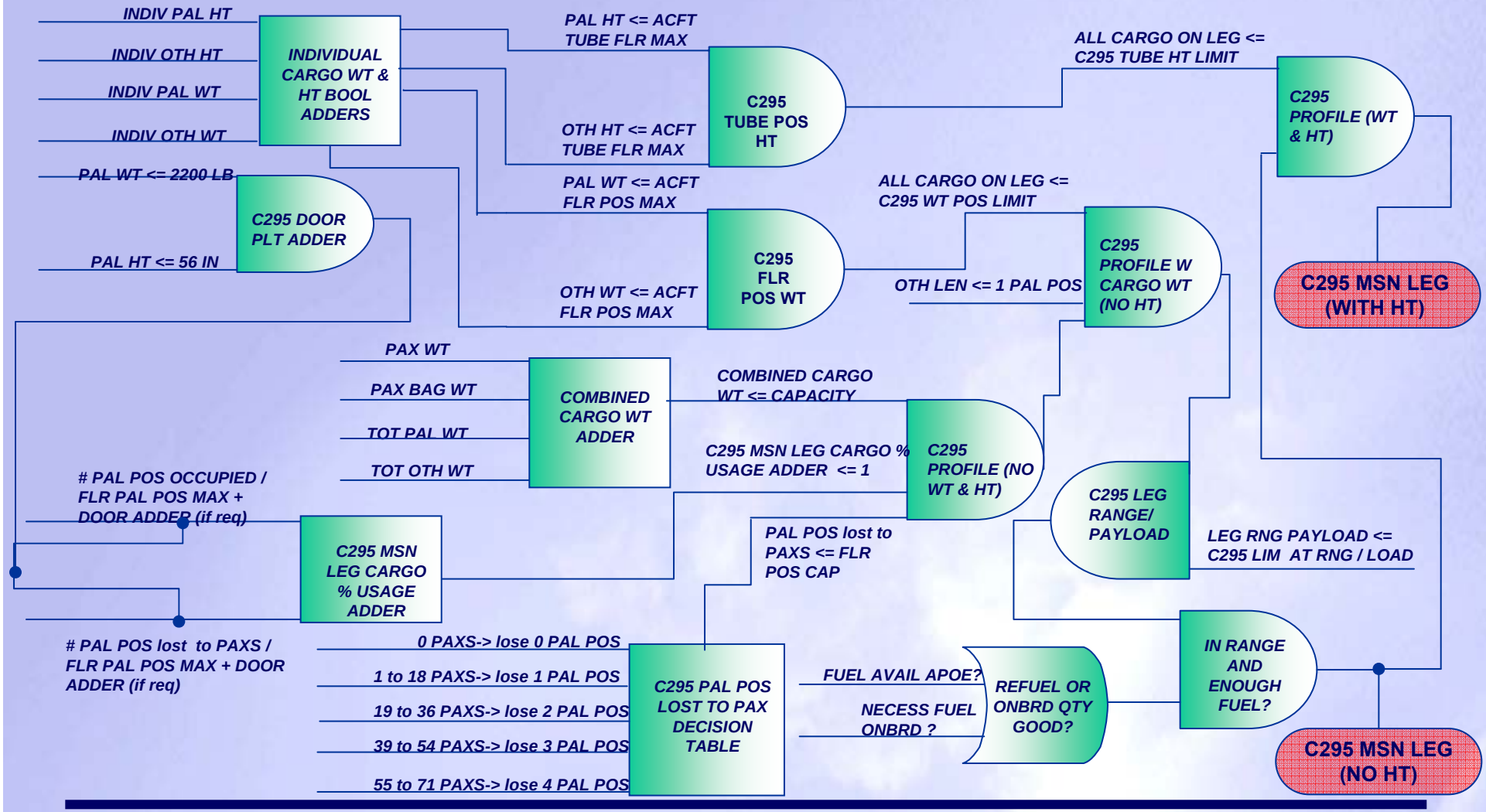
Enabling the "Global" in "Global Vigilance, Reach and Power!"

METHODOLOGY
(MISSION LEG DETERMINATION)



Enabling the "Global" in "Global Vigilance, Reach and Power!"

METHODOLOGY
(MISSION LEG DETERMINATION)



Enabling the "Global" in "Global Vigilance, Reach and Power!"

METHODOLOGY
(MISSION DETERMINATION)

ANALYSIS
(SIDE ANALYSIS)

- *After the mission legs were compiled into a tabular list, C-130 legs were studied for capacity and volumetric usage to see how much of the aircraft was utilized on each leg*

- *Legs that were determined JCA capable were studied for capacity and volumetric usage to see how much each of the JCA aircraft were utilized on each qualifying leg*

- *The results are then graphed*

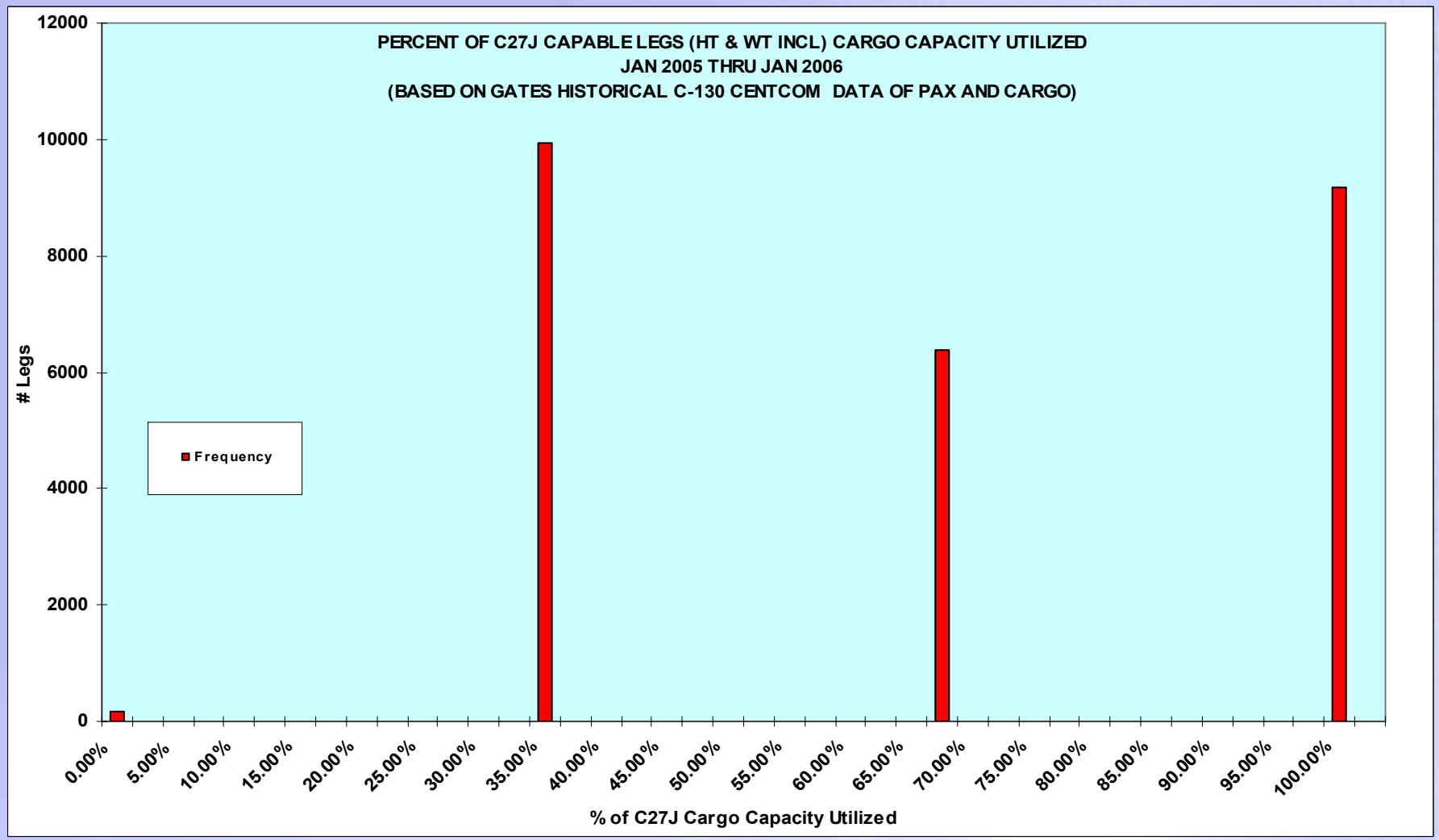
% OF USAGE OF C130 CARGO CAPACITY	C130 LEG VOLUMETRIC USAGE	% OF C130 LEG VOLUMETRIC USAGE
40.00%	1122.0	47.78%
50.00%	559.0	30.31%
20.00%	561.0	30.38%
83.33%	1377.0	55.69%
33.33%	452.0	26.99%
20.00%	561.0	30.38%
66.67%	1080.0	46.48%
20.00%	561.0	30.38%

% OF USAGE OF C27J CARGO CAPACITY	C27J LEG VOLUMETRIC USAGE	% OF C27J LEG VOLUMETRIC USAGE	% OF USAGE OF C295 CARGO CAPACITY	C295 LEG VOLUMETRIC USAGE	% OF C295 LEG VOLUMETRIC USAGE
66.67%	913.000	66.67%	50.00%	616.0	45.16%
100.00%	559.000	40.82%	-2.50%	559.0	-2.50%
33.33%	456.500	33.33%	25.00%	308.0	22.58%
-2.50%	1272.500	-2.50%	-2.50%	1124.0	-2.50%
-2.50%	452.000	-2.50%	-2.50%	452.0	-2.50%
33.33%	456.500	33.33%	25.00%	308.0	22.58%
-2.50%	1080.000	-2.50%	-2.50%	1080.0	-2.50%
33.33%	456.500	33.33%	25.00%	308.0	22.58%

ANALYSIS
(SIDE ANALYSIS CAPACITY & VOL EQUATIONS)

- **Volumetric:**
  - The Maximum Pallet Volume For All Aircraft Was Determined As Follows:
    - (#Pal Pos*88*108*HT Lim)+(1*88*108*DR HT Lim (if req)) / 1728
  - The Msn Leg Pallet Volume Used For Was Determined As Follows:
    - ∑ (88*108*Indiv Pal HT) + ∑ (88*108*Oth Cargo HT) + # Pal pos Lost to PAX *(88*108*HT Lim)
  - The % Volumetric Capacity Per Leg Was As Follows:
    - Msn Leg Pallet Volume / Maximum Pallet Volume
- **Cargo:**
  - The Equation for Cargo Capacity Determination Is As Follows:
    - (# Pal Lost To PAX / (# FLR Pal Capacity + DR Pal Pos)) + (# Pal Onboard / (# FLR Pal Capacity + DR Pal Pos))……..(DR Pal Pos May Not Be Applicable)
  - The % Cargo Capacity Per Leg Was Determined As Follows:
    - Cargo Capacity Determination / 1

DATA
(OVERALL MSN AND LEG ANALYSIS)



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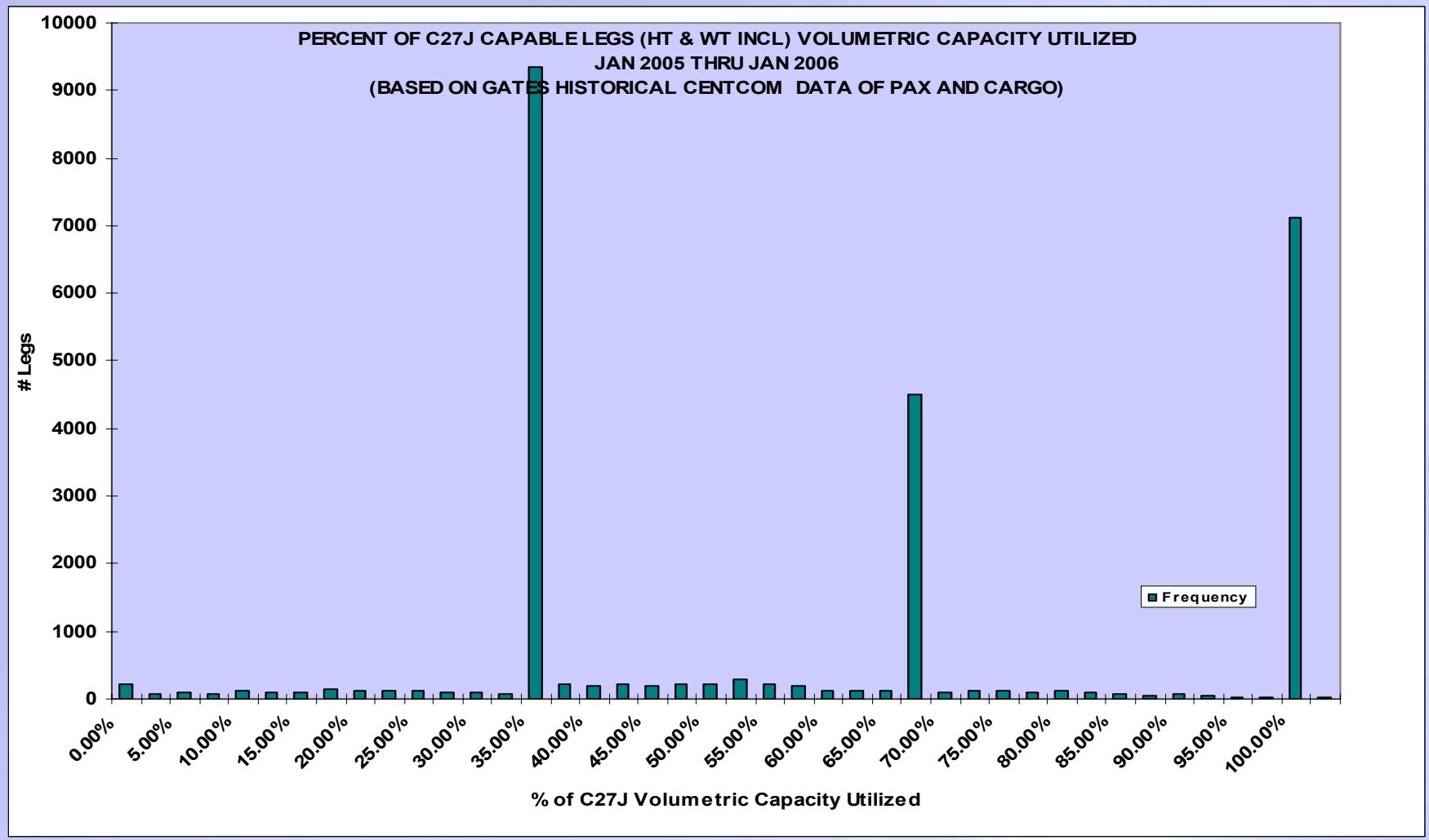
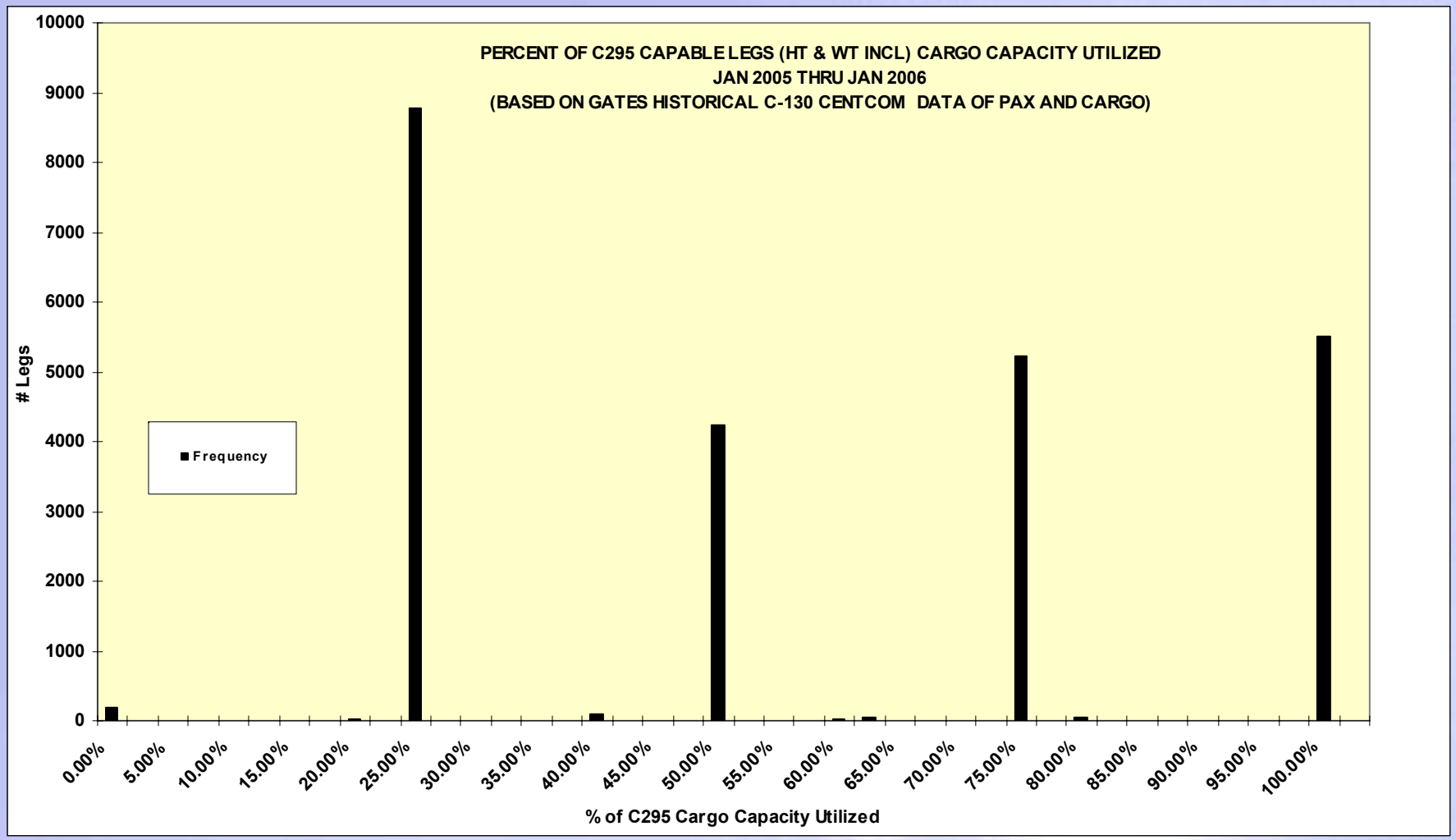
DATA
(OVERALL MSN AND LEG ANALYSIS)



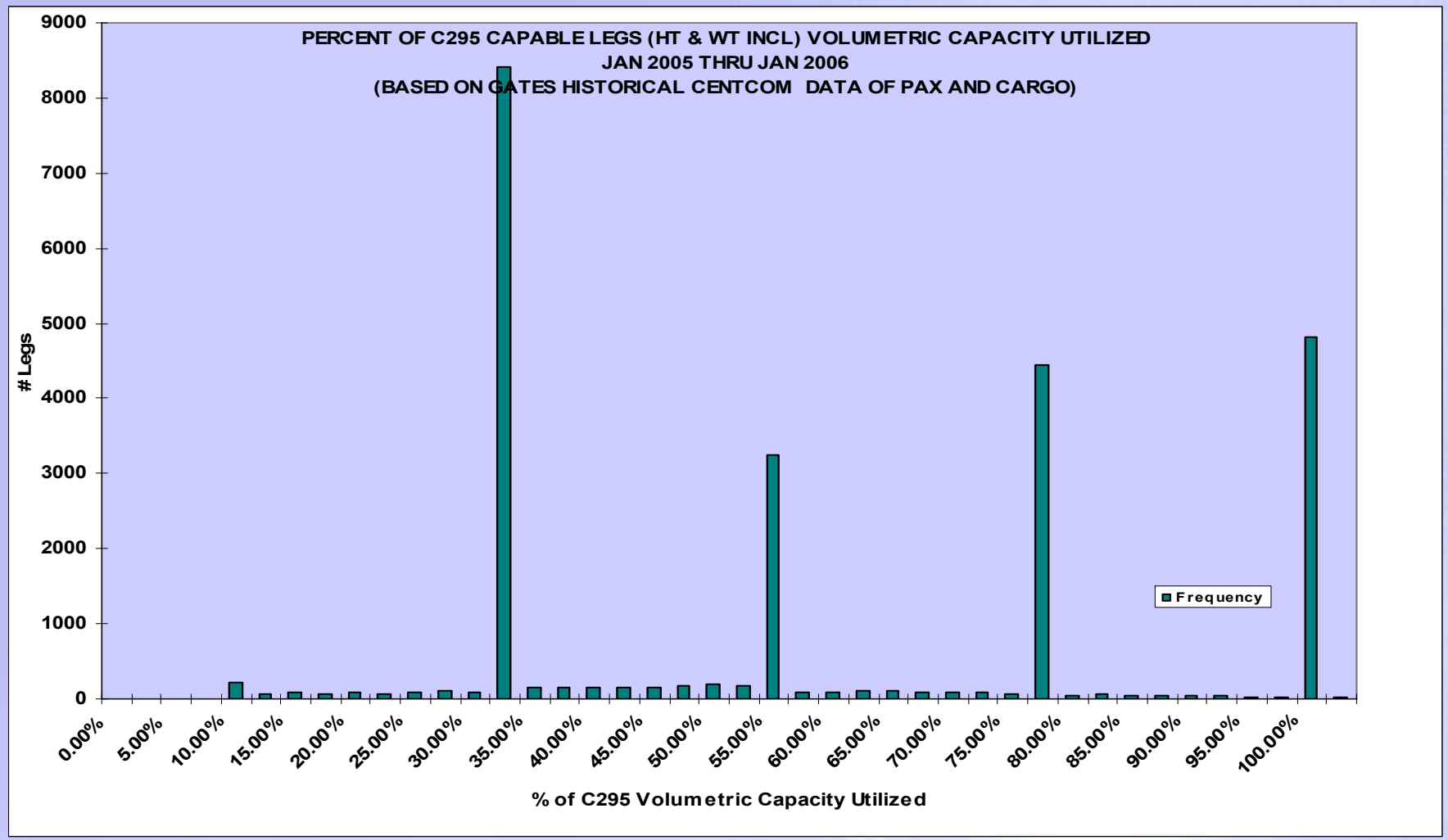
Enabling the "Global" in "Global Vigilance, Reach and Power!"

DATA
(OVERALL MSN LEG ANALYSIS)



Enabling the "Global" in "Global Vigilance, Reach and Power!"

DATA
(OVERALL MSN LEG ANALYSIS)



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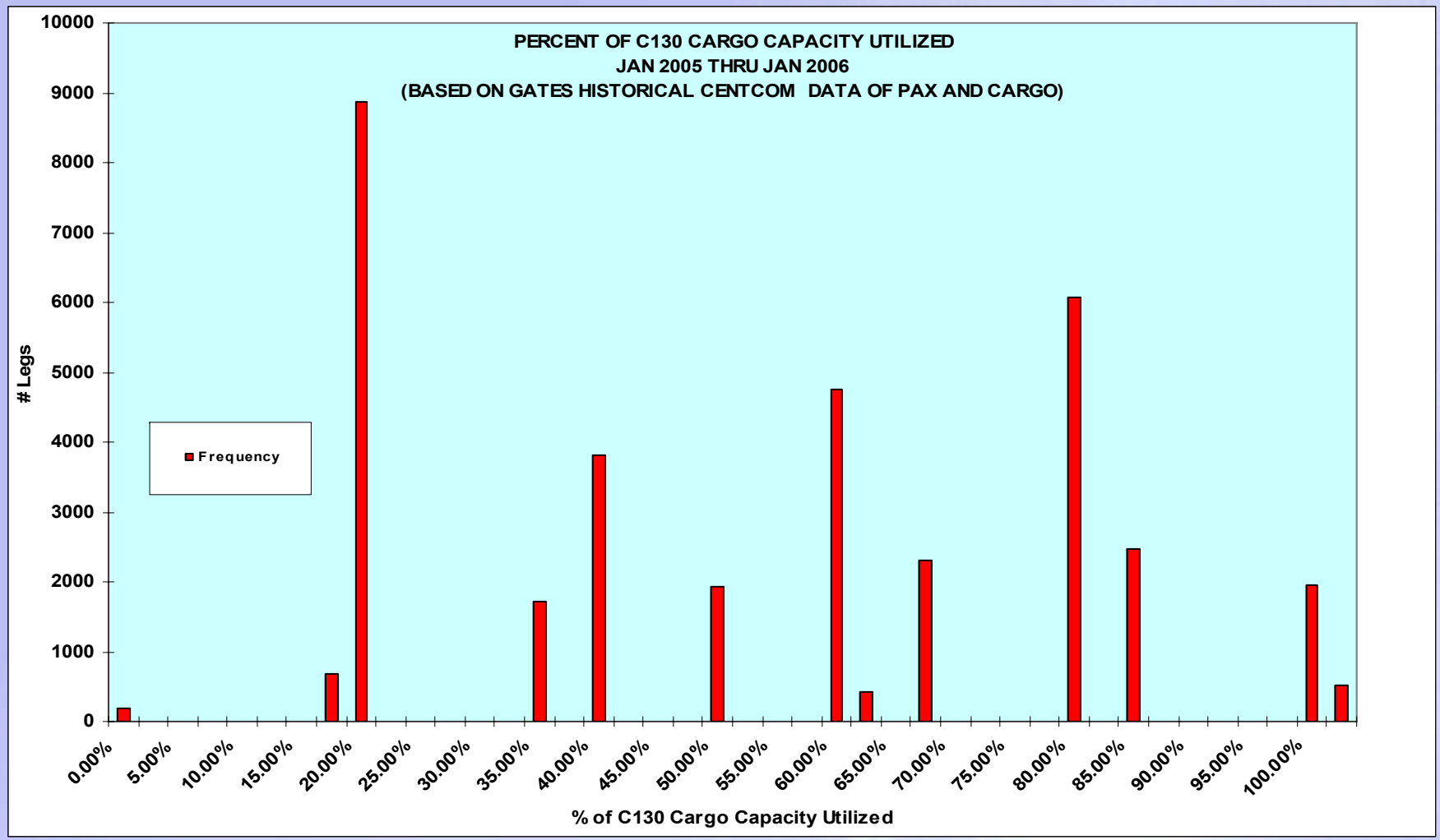
DATA
(OVERALL MSN LEG ANALYSIS)



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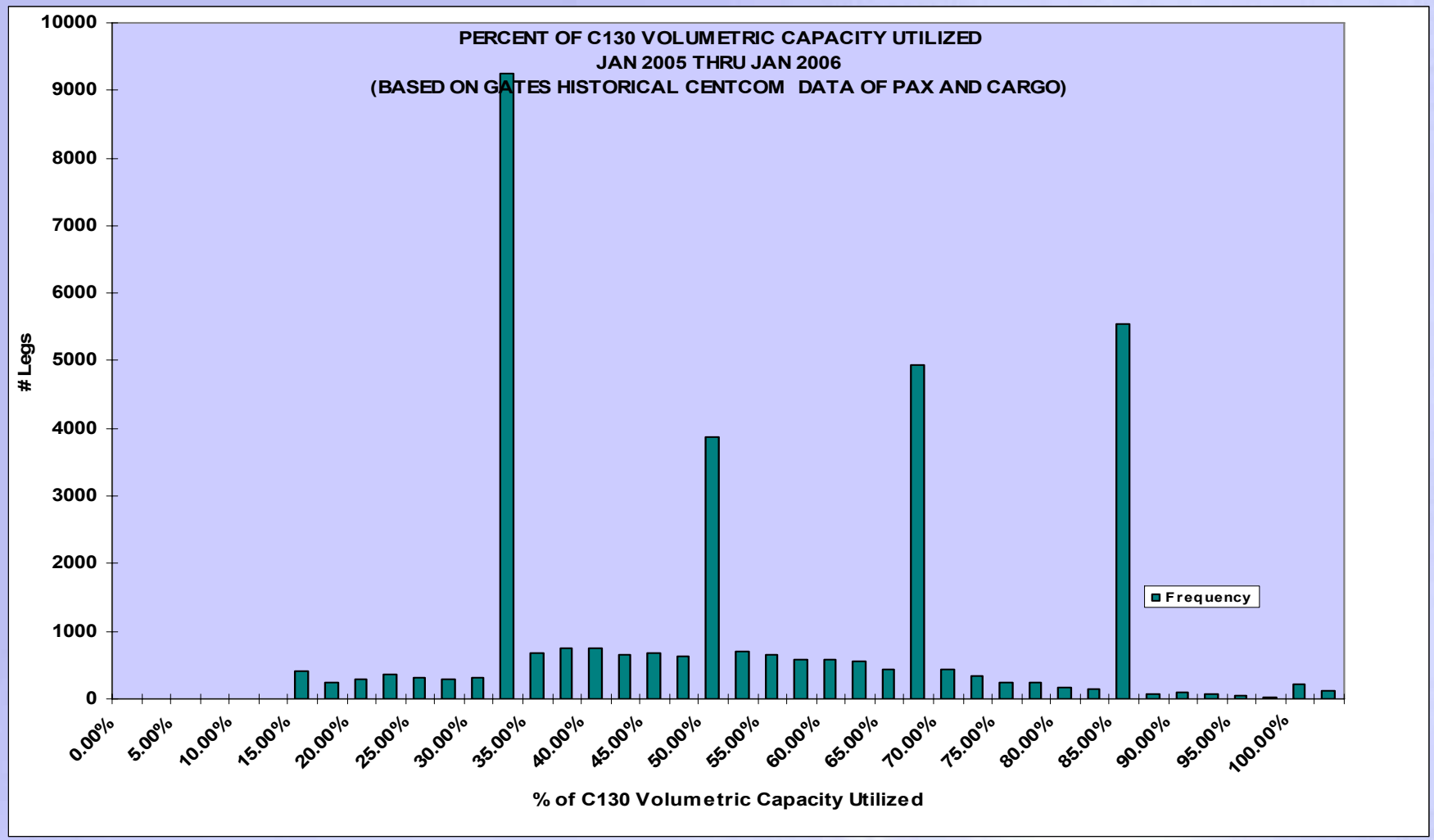
DATA
(OVERALL MSN LEG ANALYSIS)



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ANALYSIS
(MISSION DETERMINATION)

- *Missions were also sorted by date occurrence to look for trends*

- *Data was evaluated to see how many days out of the sample date range could the JCA perform a percentage of the historical C-130 missions*

- *The data was then charted*

 # MSNS BY DATE

Count of DATE	
DATE	Total
1-Jan-05	6
31-Jan-05	6
1-Feb-05	65
2-Feb-05	57
3-Feb-05	50

 # C-27J MSNS (NO HT) BY DATE

Sum of C-27J MSN W WT (NO HT INCL)?	
DATE	Total
1-Jan-05	4
31-Jan-05	3
1-Feb-05	44
2-Feb-05	45
3-Feb-05	36

 # C-27J MSNS (INCL HT) BY DATE

Sum of C-27J MSN W WT (HT INCL)?	
DATE	Total
1-Jan-05	2
31-Jan-05	3
1-Feb-05	42
2-Feb-05	44
3-Feb-05	32

 # C-295 MSNS (NO HT) BY DATE

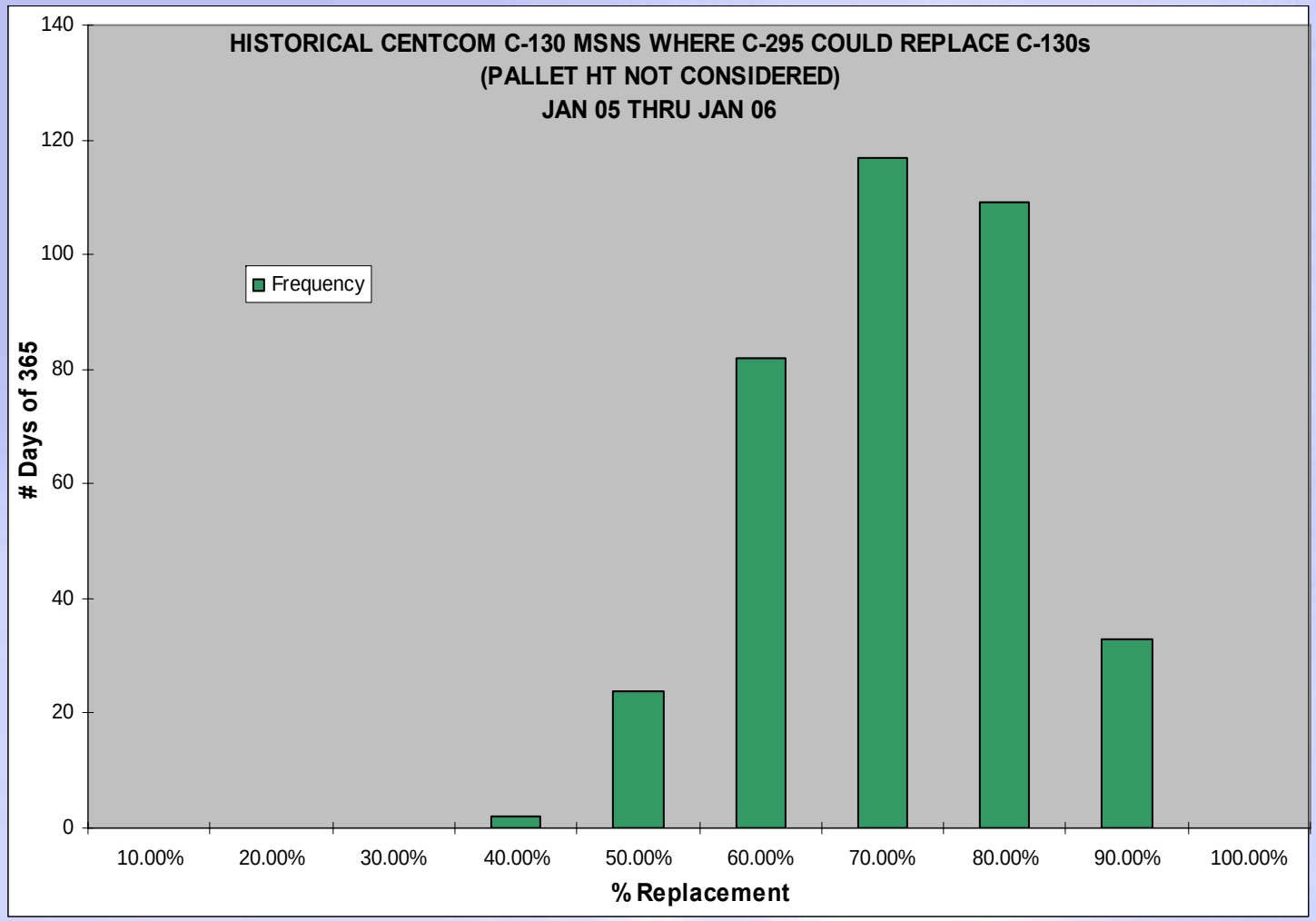
Sum of C-295 MSN W WT (NO HT INCL)?	
DATE	Total
1-Jan-05	3
31-Jan-05	3
1-Feb-05	49
2-Feb-05	41
3-Feb-05	33

 # C-295 MSNS (INCL HT) BY DATE

Sum of C-295 MSN W WT (HT INCL)?	
DATE	Total
1-Jan-05	1
31-Jan-05	2
1-Feb-05	40
2-Feb-05	38
3-Feb-05	29

RESULTS

% Msns	# Days
10.00%	0
20.00%	0
30.00%	0
40.00%	4
50.00%	45
60.00%	104
70.00%	111
80.00%	87
90.00%	16
100.00%	0



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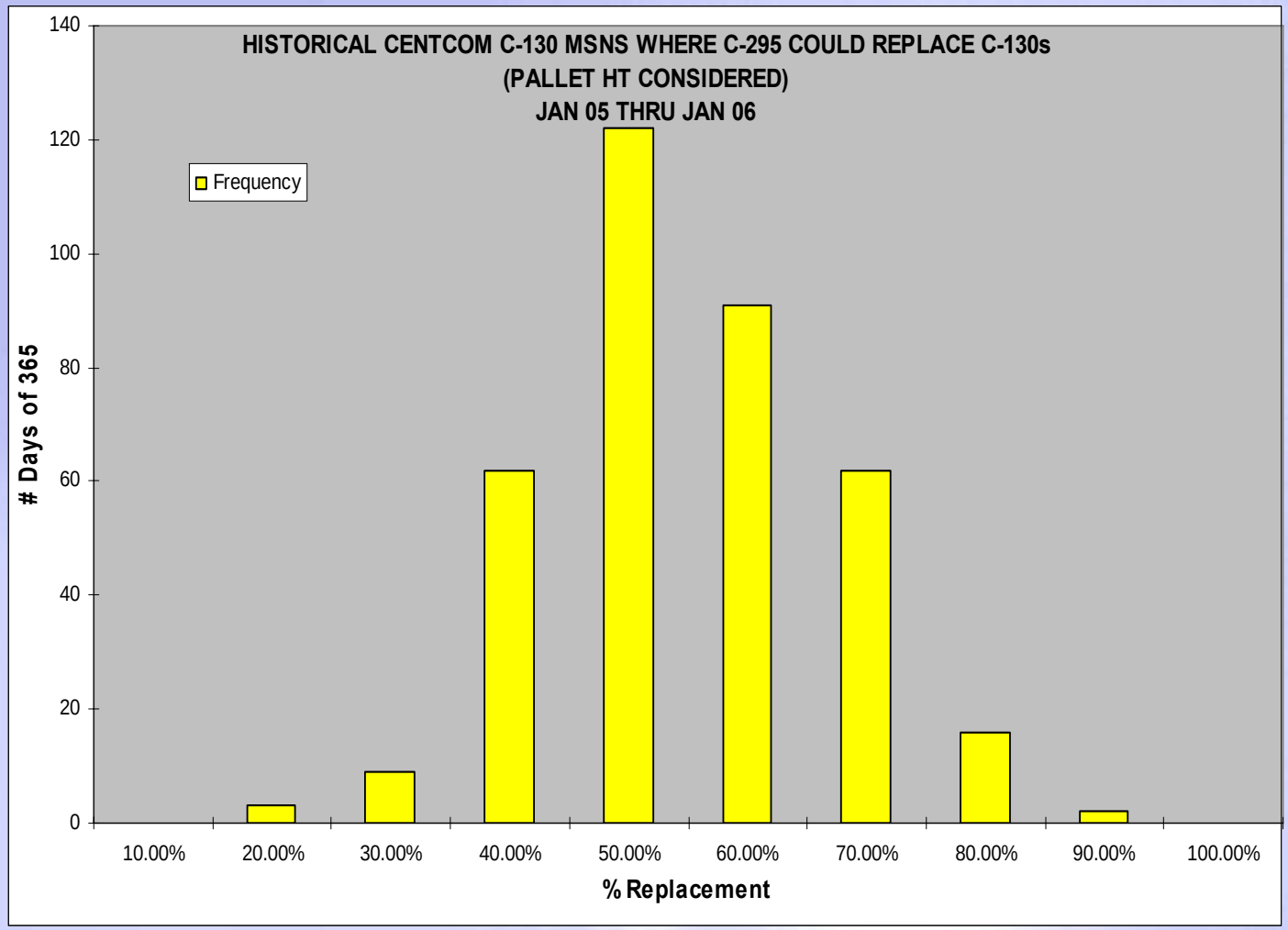
RESULTS

% Msns	# Days
10.00%	0
20.00%	3
30.00%	11
40.00%	64
50.00%	122
60.00%	90
70.00%	60
80.00%	15
90.00%	2
100.00%	0



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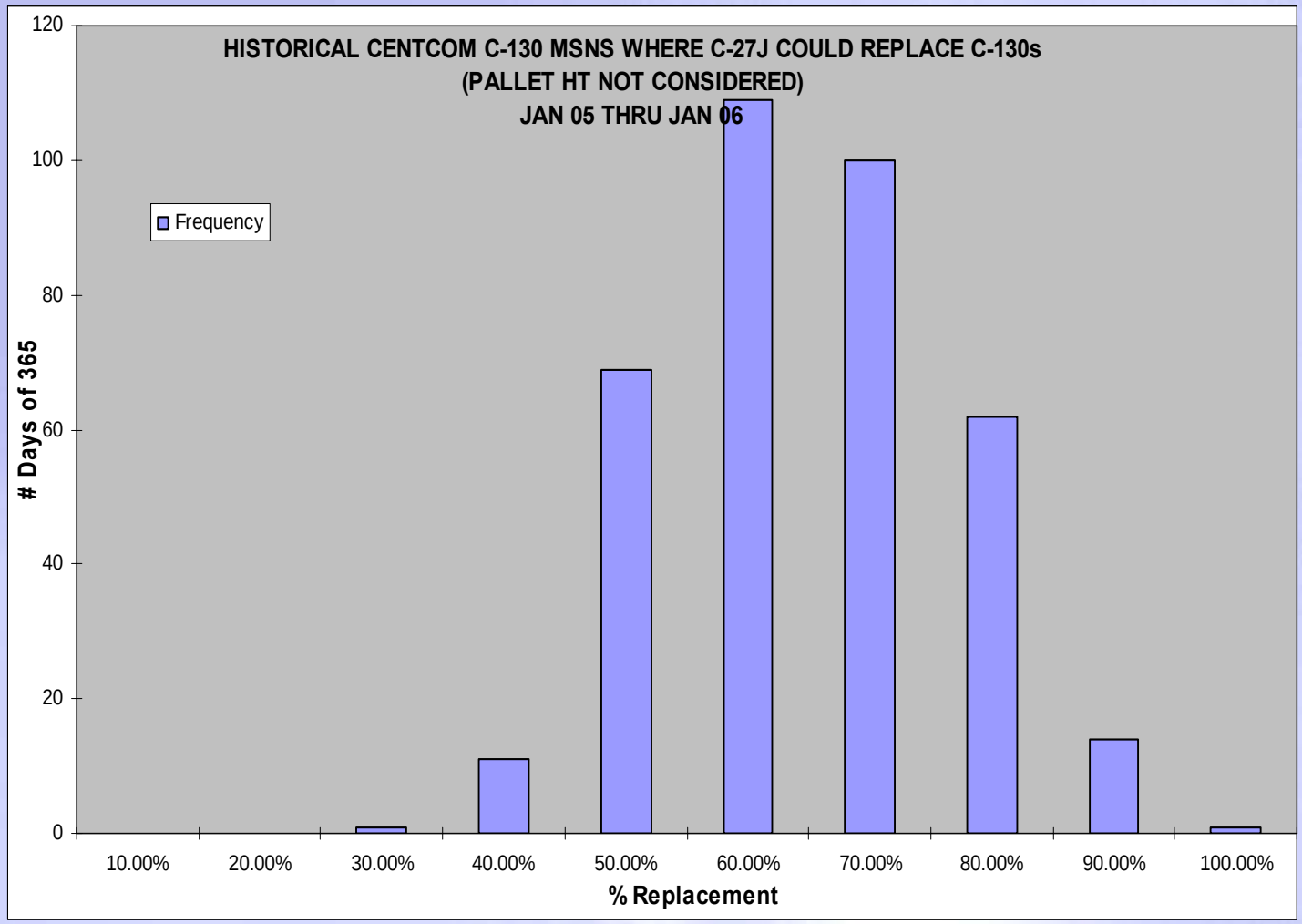
RESULTS

% Msns	# Days
10.00%	0
20.00%	0
30.00%	1
40.00%	15
50.00%	75
60.00%	118
70.00%	89
80.00%	57
90.00%	11
100.00%	1



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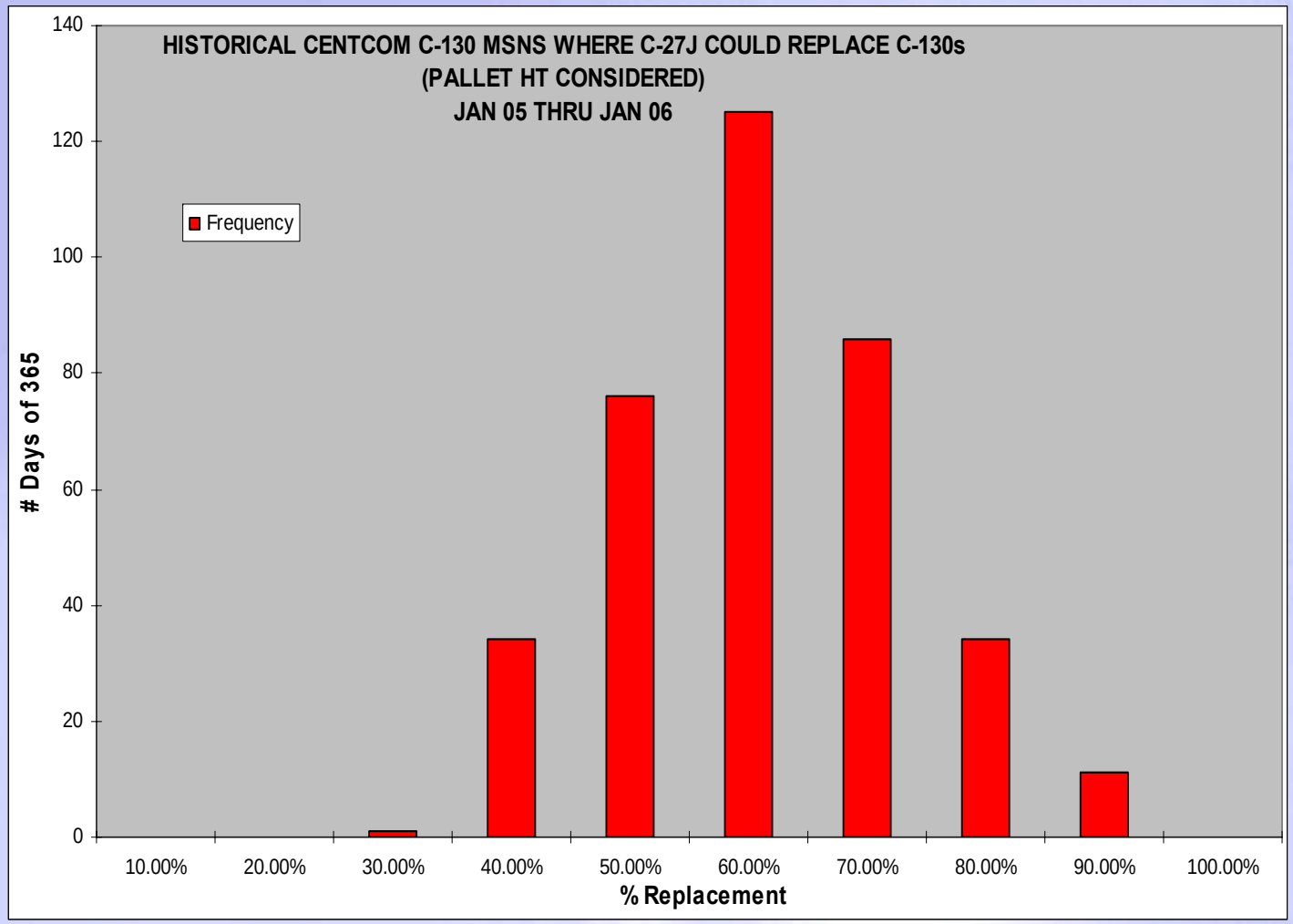
RESULTS

% Msns	# Days
10.00%	0
20.00%	0
30.00%	2
40.00%	37
50.00%	86
60.00%	119
70.00%	86
80.00%	27
90.00%	10
100.00%	0



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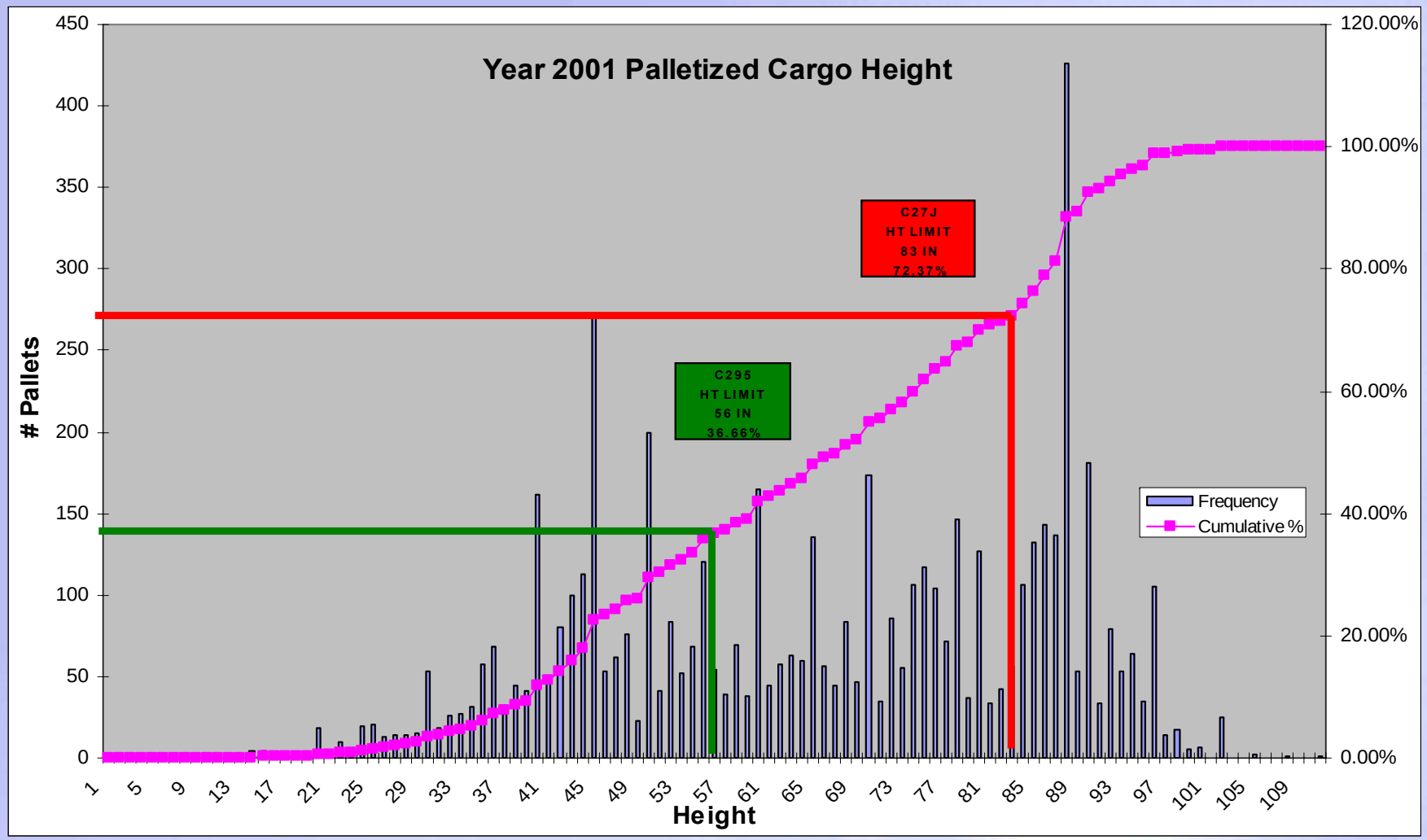
HISTORICAL C-130 INDIVIDUAL PALLET HEIGHT ANALYSIS



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HISTORICAL C-130 INDIVIDUAL PALLET HEIGHT ANALYSIS

- ***The Pallet Height chart (Histograms) reflects the measured Height that was Recorded In GATES Database for each C-130 Pallet that was flown on a Historical C-130 Mission***

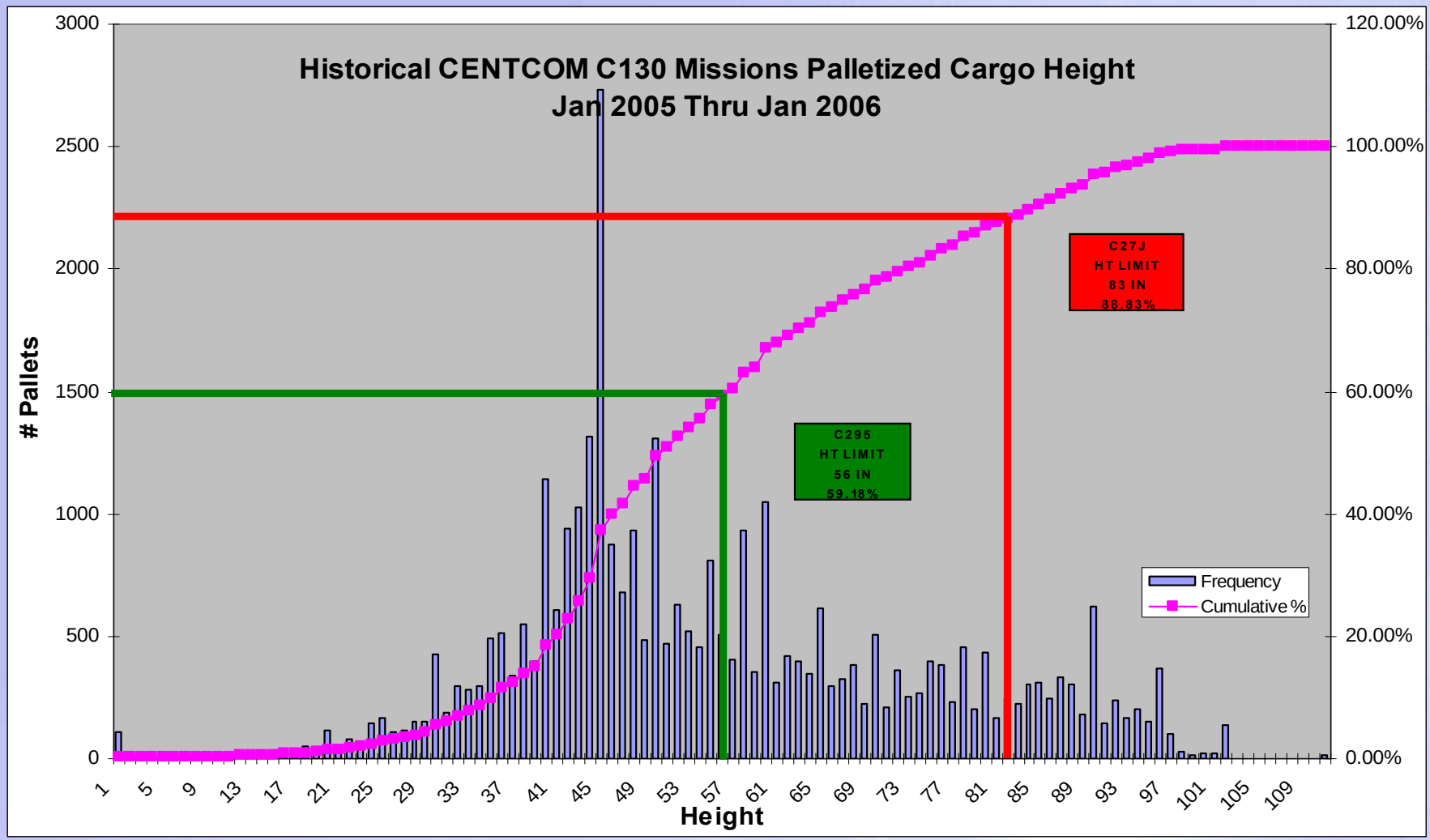
  - ***The C-295 and C-27J lines on the Pallet Height chart reflect the number of historical pallets that met the specific C-295 and the C-27J height requirements***

  - ***The Pallet Height does not reflect the actual number of pallets that fit the C-27J and C-295 profiles (evaluating for both weight and height)***

  - ***Pallets fitting both the height and weight requirements for each JCA were identified through the complete analysis and are identified in the results slide***

  - ***The cumulative line represents the overall percentage of pallets that were built to that particular height***

HISTORICAL C-130 INDIVIDUAL PALLET HEIGHT ANALYSIS



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HISTORICAL C-130 INDIVIDUAL PALLET HEIGHT ANALYSIS (Data Snapshot)

Height	# Pallets	Cumulative %
1	105	0.30%
2	0	0.30%
3	1	0.30%
4	2	0.31%
5	3	0.32%
6	5	0.33%
7	1	0.33%
8	11	0.37%
9	3	0.37%
10	11	0.41%
11	8	0.43%
12	25	0.50%
13	10	0.53%
14	18	0.58%
15	28	0.66%
16	35	0.76%
17	19	0.81%
18	49	0.95%
19	21	1.01%
20	115	1.34%
21	50	1.48%
22	81	1.72%
23	59	1.88%
24	143	2.29%
25	164	2.76%
26	112	3.08%
27	118	3.42%
28	152	3.85%
29	155	4.29%
30	423	5.50%
31	189	6.04%
32	300	6.90%
33	282	7.70%
34	297	8.55%
35	494	9.96%
36	514	11.42%
37	338	12.39%
38	553	13.97%
39	401	15.11%
40	1143	18.37%
41	610	20.12%
42	943	22.81%
43	1029	25.74%
44	1318	29.51%
45	2730	37.30%
46	877	39.80%
47	678	41.73%
48	930	44.39%
49	481	45.76%
50	1312	49.51%
51	469	50.84%
52	627	52.63%
53	520	54.12%
54	457	55.42%
55	809	57.73%
56	507	59.18%
57	408	60.34%
58	936	63.01%
59	351	64.02%
60	1051	67.02%
61	308	67.89%
62	420	69.09%
63	400	70.24%
64	346	71.22%
65	616	72.98%
66	299	73.83%
67	324	74.76%
68	385	75.86%
69	226	76.50%
70	503	77.94%
71	212	78.54%
72	360	79.57%
73	250	80.28%
74	265	81.04%
75	394	82.17%
76	385	83.26%
77	228	83.91%
78	452	85.20%
79	202	85.78%
80	433	87.02%
81	169	87.50%
82	243	88.19%
83	222	88.83%
84	301	89.69%
85	313	90.58%
86	249	91.29%
87	332	92.24%
88	306	93.11%
89	178	93.62%
90	625	95.40%
91	142	95.81%
92	241	96.50%
93	167	96.97%
94	203	97.55%
95	149	97.98%
96	367	99.02%
97	101	99.31%
98	32	99.40%
99	13	99.44%
100	21	99.50%
101	21	99.56%
102	137	99.95%

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HISTORICAL C-130 INDIVIDUAL PALLET WEIGHT ANALYSIS

- ***The Pallet weight chart (Histograms) reflects the measured Weight that was Recorded In GATES Database for each C-130 Pallet that was flown on a Historical C-130 Mission***

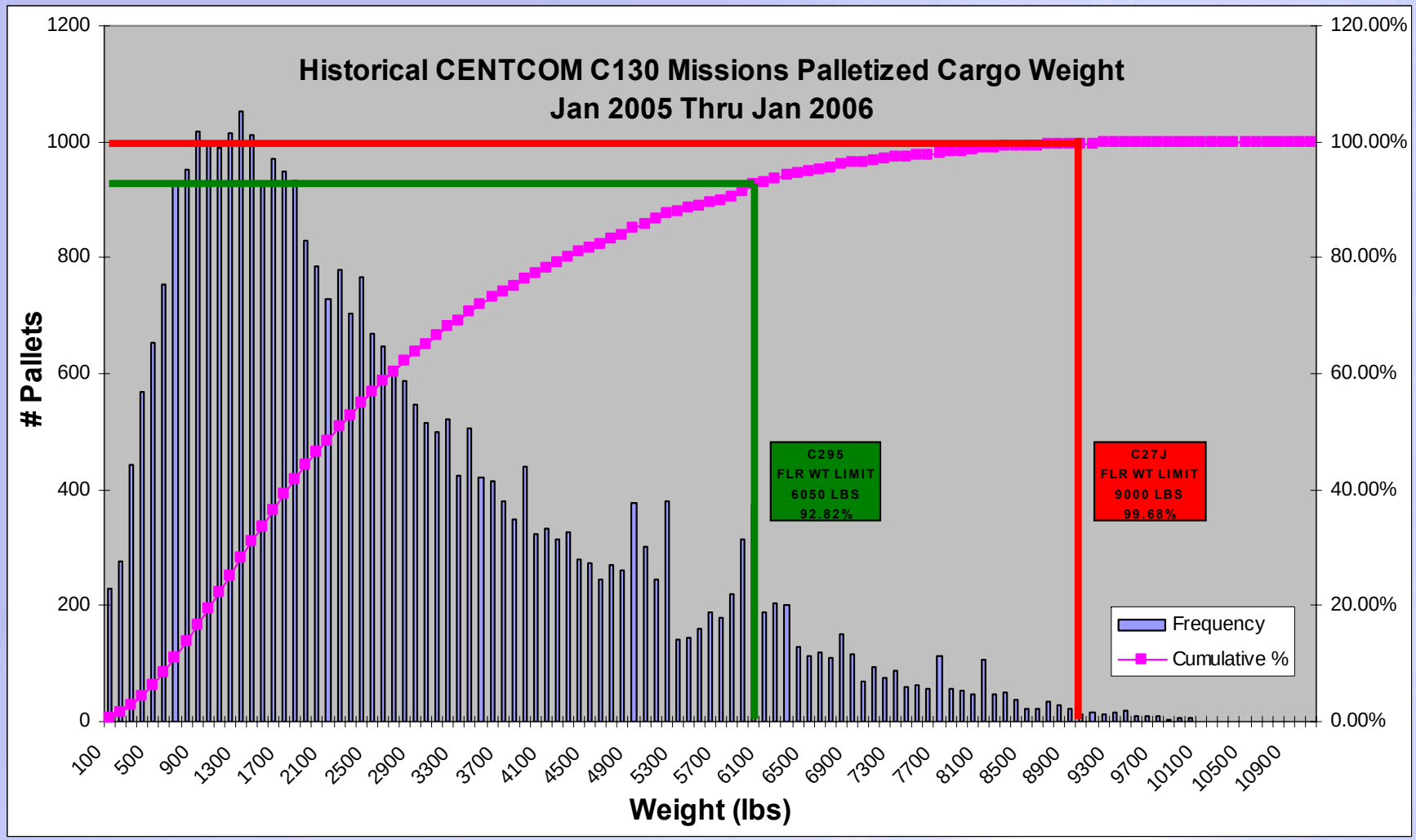
  - ***The C-295 and C-27J lines on the Pallet Weight chart reflect the number of historical pallets that met the specific C-295 and the C-27J weight requirements***

  - ***The Pallet Weight Chart does not reflect the actual number of pallets that fit the C-27J and C-295 profiles (evaluating for both weight and height)***

  - ***Pallets fitting both the height and weight requirements for each JCA were identified through the complete analysis and are identified in the results slide***

  - ***The cumulative line represents the overall percentage of pallets that were built to that particular Weight***

HISTORICAL INDIVIDUAL C-130 PALLET WEIGHT ANALYSIS



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HISTORICAL C-130 INDIVIDUAL PALLET WEIGHT ANALYSIS (Data Snapshot)

Weight	*# Pallets*	*Cumulative %*	*Weight*	*# Pallets*	*Cumulative %*	*Weight*	*# Pallets*	*Cumulative %*
100	229	0.65%	3100	500	66.55%	6100	189	93.09%
200	276	1.44%	3200	521	68.04%	6200	205	93.68%
300	444	2.71%	3300	425	69.25%	6300	200	94.25%
400	570	4.34%	3400	506	70.70%	6400	129	94.62%
500	654	6.20%	3500	421	71.90%	6500	113	94.94%
600	755	8.36%	3600	416	73.09%	6600	118	95.28%
700	926	11.00%	3700	379	74.17%	6700	110	95.59%
800	952	13.72%	3800	348	75.16%	6800	150	96.02%
900	1017	16.62%	3900	440	76.42%	6900	116	96.35%
1000	994	19.46%	4000	322	77.34%	7000	70	96.55%
1100	990	22.28%	4100	332	78.28%	7100	95	96.82%
1200	1014	25.18%	4200	315	79.18%	7200	75	97.03%
1300	1053	28.18%	4300	328	80.12%	7300	87	97.28%
1400	1010	31.06%	4400	279	80.92%	7400	61	97.46%
1500	922	33.69%	4500	273	81.69%	7500	64	97.64%
1600	970	36.46%	4600	246	82.40%	7600	56	97.80%
1700	948	39.17%	4700	270	83.17%	7700	112	98.12%
1800	934	41.83%	4800	261	83.91%	7800	56	98.28%
1900	830	44.20%	4900	378	84.99%	7900	53	98.43%
2000	785	46.44%	5000	301	85.85%	8000	48	98.57%
2100	728	48.52%	5100	244	86.55%	8100	108	98.88%
2200	778	50.74%	5200	379	87.63%	8200	48	99.01%
2300	705	52.75%	5300	142	88.03%	8300	51	99.16%
2400	766	54.94%	5400	145	88.45%	8400	39	99.27%
2500	668	56.85%	5500	159	88.90%	8500	23	99.34%
2600	647	58.69%	5600	190	89.44%	8600	23	99.40%
2700	607	60.43%	5700	180	89.96%	8700	34	99.50%
2800	586	62.10%	5800	221	90.59%	8800	27	99.57%
2900	547	63.66%	5900	315	91.49%	8900	23	99.64%
3000	514	65.13%	6000	374	92.55%	9000	14	99.68%

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